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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Industrial Outlook

SIR MAX MUSPRATT, in his address the other day to the Scottish Section of the Federation of British Industries, did not overstate the case when he suggested that this country had survived in the past year an experience from which most people would have predicted national disaster, and that the resources of Great Britain had astonished not only ourselves but the world at large. His estimate was that there was not more than a 30 per cent. stoppage of the industrial organisation, and that production was maintained at about the figure of 70 per cent. It is, as Sir Max suggests, an undoubtedly wonderful achievement, but it should not obscure the fact that the losses have not yet been liquidated. The Federation regards the national expenditure of the past year as so exceptional that the losses should be spread over 10 to 15 years. This view is to be pressed on the Chancellor of the Exchequer, whose decision will be awaited with interest.

Sir Max Muspratt is not alone in his hope that the remarkable recovery in industry is not transitory. It is, however, generally recognised that peace in industry is essential to progress, and it is satisfactory to note that the purely negative and pugnacious parties on either side are becoming discredited. The more enlightened employers have long recognised that good wages and conditions, coupled with human treatment, not only produce good feeling in the workshop, but that the larger purchasing power of the workers following on high wages has an immediate effect in stimulating trade. On the other side, the great majority of workers, who are never happier than when they are in full work, are beginning to see that the ruin of British industry means equally their own ruin. The negative and obstructive policy of introducing into the workshops mischief for mischief's sake, without even the ghost of an idea of how to improve the workers' conditions, is already seen through by the more intelligent trade unionists, and the agitator element is losing ground. Not only is there encouragement in this evidence of returning sanity, but it is equally encouraging to find public confidence so high. In spite of the China trouble, the money market is full of optimism. Not only gilt-edged stocks, but new industrial securities continue to be snapped up within a short period of the opening of the lists, and since the new year there has been an appreciable rise in the value of British stocks. The stable firms have weathered the storm, though not without anxiety, and though, as our readers may have noticed, one or two small concerns have gone under, there has been no striking failure in any branch of the chemical industry. The reasoned confidence which Sir Max Muspratt feels in the future really seems well founded, and no one could have indicated more truly the spirit in industry required to justify it.

French Industrial Restoration

THE report just issued on the economic and industrial conditions in France during 1925-26, prepared by Mr. J. R. Cahill and published by the Department of Overseas Trade (H.M. Stationery Office, 7s. 6d., pp. 300), covers the whole field with the thoroughness and competence that one has come to expect in these volumes. From the purely chemical side there is perhaps less direct treatment of the chemical industry as a unit than in some similar volumes, but there is abundant evidence that chemical science and engineering have played a very important part in the national recovery. It is satisfactory to hear that within eight years of the Armistice France has completed by her own resources the industrial and agricultural restoration of the ten devastated counties, and in reconstituting and re-equipping thousands of factories and building anew hundreds of thousands of farms and dwellings, the whole area has been transformed into an economic whole of far greater capacity than ever before. For the last five years, we are told, France has enjoyed an unbroken period of tense industrial and commercial activity. Unemployment has been non-existent; and although aliens to the number of one and a half millions

have been introduced, even with this contribution to labour power, and with greatly enhanced mechanical equipment, the output has been constantly limited by labour shortage.

The rapid evolution towards the higher organisation of industry is one of the features emphasised by Mr. Cahill. It is specifically noticed in metallurgy, heavy and light chemicals, dyestuffs, pharmaceuticals, artificial silk, dyeing and bleaching, rubber, and potash. The movement has been steadily towards large scale business. Improvements are being steadily promoted throughout French agriculture by the more extensive use of fertilisers, of potash, and of superphosphates. Some idea of France's power and production capacity may be gained from the following figures for the years 1913, 1925, and nine months of 1926 :—

Plant and Equipment.

	1913	1925	1926
Hydro-electric capacity (1,000 kw.)	647	1,813	1,900
Thermic capacity (1,000 kw.) ..	1,000	3,229	3,500
Coke ovens	4,265	5,900	6,200
Blast furnaces in blast	127	140	149
Electric furnaces in operation ..	24	22	22
Artificial silk factories	—	19	34

Production.

	1913	1925	1926
	(Thousands of metric tons.)		
Coal	40,844	48,054	38,500
Coke (metallurgical)	4,027	6,500	5,500
Patent fuel	2,669	3,654	3,125
Mineral oils	48	64·9	53
Bauxite	309	407	325
Aluminium	13·5	22	—
Potash salts	(c)	1,926	939
Potash (K_2O)	(c)	311	267
Superphosphates	1,979	2,381	—
Phosphates	335	226	—
Phosphatic slag	617	1,386	—
Sulphate of ammonia ..	75	117	—
Sulphate of copper	26	35	—
Calcium cyanamide	7·5	55	—
Potassium nitrate and cyanamide	12	50	—
Dyes	—	14·6	—
Artificial silk	1·7	6·7	—

(c) Under German control in 1913. The production of potash salts was 350, and of K_2O 58,000 tons.

It is of interest to note that the coal-mining industry has already far exceeded its 1913 output and that increased productivity is expected in the future, not only in coal output but also in that of patent fuel, coke, and by-products, such as electricity, gas, benzol, and synthetic ammonia. Tar, pitch, benzol, oils, gas and ammonia are being produced in steadily increasing quantities, and in conjunction with the two great chemical groups of St. Gobain and Kuhlmann some of the greatest mines are also producing synthetic ammonia. In calcium carbide (entirely a product of the electric furnaces) the output, which was 45,000 tons in 1913, was 70,000 and 75,000 in 1924 and 1925. Of other chemicals due to electric energy operations, phosphorus is produced in one French factory near Moutiers, which produced 300 tons in 1913 and 2,750 tons in 1921 ; in the same year the output of chlorates, of which in 1913 several thousand tons were exported, reached about 2,750 tons. The electrolytic production of sodium, as from the caustic soda phase, amounts to 800 tons a year. France possesses two factories for nitric acid. Of calcium cyanamide France produced 7,500 tons in 1913 and 17,000 tons in 1922 ; she can now produce 158,000 tons a year.

In Alsace, the production of the ex-German potash mines and of the mine in French ownership at the outbreak of the war, has been steadily increasing since 1919. The output of potash salts advanced from 591,471 tons in 1919 to 1,925,838 tons in 1925, while the output of pure potash increased from 94,189 tons to 310,300 tons over the same period. On the whole, it would seem that France has good reason to be satisfied with the remarkable industrial and economic recovery made since the war.

The Hydrogenation of Coal

For some time past, opinions on the real industrial value of the Bergius method for the production of oil from coal by hydrogenation have differed considerably. In spite of the fact that investigatory work, at a very high cost, was still being pursued, it was thought that the grave technical difficulties which confronted the process, especially on the engineering side, might lead once more to disappointment. Moreover, the favourable accounts of Fischer's work which have been published, and the undoubted great ease of working of the Fischer process, have attracted so much attention that interest in the Bergius process has somewhat flagged. Considerable interest therefore attaches to Dr. Bergius's own analysis of the situation, contained in an address to the Pittsburgh International Congress on Bituminous Coal, an account of which is given in this issue.

As regards the production of oil-fuel from coal, the first point which needs discussion is that of the relative values of the three processes now under investigation—hydrogenation, low temperature carbonisation, and the Fischer process. Dr. Bergius gives it as his opinion that the last two processes are not likely to settle the problem. Low temperature carbonisation, he points out, only produces oil fuel as a by-product, and its success must depend in the main on the coke obtained. The methods used by Fischer have successfully produced methanol ; but apparently the industrial interests concerned have so far made no effort to utilise the same means for the production of oil fuel. Dr. Bergius seems to think that this is evidence of the fact that the extension of the process to the latter sphere is not feasible. He also raises an interesting point with regard to the modification recently introduced, whereby the Fischer process is run at low pressures : namely, that the technique of high-pressure work, chiefly through the intensive efforts which have been applied to the production of ammonia, has reached such a pitch of excellence that the possibility of working at low pressures has lost much of its importance. With regard to his own methods, Dr. Bergius is apparently very hopeful. He does not minimise the difficulties which exist : for example, it is pointed out in his address that the question of temperature-control is very important, not only from the point of view of the reaction proceeding, but also because weaknesses develop in the container. Nevertheless, Dr. Bergius states that the technical production of oil by his method is now assured, and that large-scale developments are being pushed forward. Support is lent to his optimism by the interests which various commercial groups (including British ones) have acquired in his process.

One very striking point raised in the address is the relation of hydrogenation to the existing coal-gas industry. So far from being inimical to the interests

of the latter, Dr. Bergius points out that it is possible to work joint gas-producing and hydrogenation plants, to the mutual advantage of both. This, if it be supported by further experience, may have far-reaching consequences. It may provide one of the bridges whereby present-day methods of coal-utilisation can be, without injury to existing undertakings, and in a smooth and orderly manner, converted to methods more in accord with the growing need for oil fuel.

The Chemist in Control

FOLLOWING upon a number of commercial projects essentially dependent on chemical science, the successful issue this week of the new Non-Inflammable Film Co., which will control the rights in certain patented and improved secret processes for the manufacture of cellulose acetate and its conversion into non-inflammable film, emphasises the growing recognition of scientific control in industry. In the case of the I.C.I. and again in this case, the purely commercial and financial interests recognise that in these highly technical operations the layman is in the hands of the expert, and that everything depends on efficient technical control. In the Non-Inflammable Film Co., the deputy-chairman of the board of directors is Dr. Herbert Levinstein, whose technical and commercial qualifications are well known; the consulting chemist is Dr. Karl Keiser, late of the Bayer Co., and the "technical management" is in the hands of Mr. H. J. Mallabar, the inventor of the non-inflammable film, and Dr. F. Westhoff, lately chemist of the Nobel Film Co. These names, with the report on the project by Messrs. Cross and Bevan, obviously mean something to the investing public. It all points to an interesting development in favour of fuller recognition of the technical man's place in industry.

New Research on Detonation

THE Air Ministry Scientific Research staff are to be congratulated on a successful piece of fundamental research on the detonation problem in engines using liquid fuel. Various remedies for the prevention of "knocking" have been developed, but hitherto the fundamental cause has been more or less obscure. As the result of investigations undertaken with the assistance of the Air Ministry Laboratory by request of the Director of Scientific Research to the Air Ministry, it has now been established "that detonation in an engine using liquid fuel is due to the formation of organic peroxides which become concentrated in the nuclear drops during compression and ignite them simultaneously when the detonation temperature of the peroxide is reached." The detonation problem is thus shown to be essentially a chemical problem, and the conclusion reached through the present research will be of fundamental value in any further investigations. It is interesting to recall that the earliest reference on record to the possible connection between peroxide formation and detonation is contained in a paper by Sir C. Brodie in 1864 communicated to the Chemical Society, dealing with "The explosibility of the peroxides of the radicles of the organic acids."

Books Received

CHEMICAL ENGINEERING ECONOMICS. By Chaplin Tyler. London: McGraw-Hill Publishing Co., Ltd. Pp. 271. 17s. 6d.

FIRST PRINCIPLES OF CHEMISTRY. By F. W. Dootson and A. J. Berry. London: Cambridge University Press. Pp. 340. 6s.

THERMODYNAMICS AND CHEMISTRY. By F. H. MacDougall. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. Pp. 414. 27s. 6d.

SECOND YEAR COLLEGE CHEMISTRY. By William H. Chapin. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. Pp. 366. 15s.

REPORT OF THE ADVISORY COMMITTEE ON ATMOSPHERIC POLLUTION, FOR THE YEAR ENDING MARCH 31, 1926. Meteorological Office, Air Ministry. London: H.M. Stationery Office. Pp. 52, 6s. 6d.

REPORT ON THE ECONOMIC AND INDUSTRIAL CONDITIONS IN FRANCE. 1925–1926. By J. R. Cahill. London: H.M. Stationery Office. Pp. 300. 7s. 6d.

The Calendar

Feb.		
7	Sir John Cass Technical Institute: "Recent Developments in Coal Mining." H. M. Morgans. 6 p.m.	Jewry Street, Aldgate, London.
7	Society of Chemical Industry (London Section): "Photographic Sensitivity." Dr. T. Slater Price. 8 p.m.	Burlington House, Piccadilly, London.
7	University of Birmingham Chemical Society: "The Development of Synthetic Colours." J. H. G. Plant.	University, Birmingham.
7	Institution of the Rubber Industry (London Section): "Set in Vulcanised Rubber." H. Turner. "Rubber Toys." H. Standring.	Engineers' Club, Coventry Street, London.
8	Society of Chemical Industry (Birmingham and Midland Section): "Metallurgical Spectroscopic Analysis." F. Twyman. 7.15 p.m.	University, Birmingham.
8	Society of Chemical Industry (South Wales Section): "Micro-organisms of the Soil." Professor J. Mangan. 7.30 p.m.	Technical College, Cathays Park, Cardiff.
8	Institution of Petroleum Technologists: General Meeting. 5.30 p.m.	Royal Society of Arts, John Street, Adelphi, London.
9	Borough Polytechnic Institute. Annual Prize Distribution. 7.30 p.m.	Borough Road, London, S.E.1.
9	Royal Society of Arts: "The Romance of the Organic Chemical Industry." Dr. E. F. Armstrong. 8 p.m.	John Street, Adelphi, London.
10	Institute of Chemistry (Liverpool Section).	St. George's Restaurant, Redcross Street, Liverpool.
10	Society of Dyers and Colourists (West Riding Section): "Work of the German Commission on Standardisation of Colour Fastness." Professor Dr. Paul Krais.	Bradford.
10	Electroplaters' and Depositors' Technical Society. Joint meeting with London Section of the Institute of Metals: "Nickel Coatings and Methods of Production." W. R. Barclay. 7.30 p.m.	83, Pall Mall, London.
10	Institution of the Rubber Industry (Manchester Section): "Proofing." J. Lloyd.	16, St. Mary's Parsonage, Manchester.
10	Optical Society: Annual General Meeting. 7.30 p.m.	Imperial College of Science and Technology, South Kensington.
10	Chemical Society: Memorial Lecture in honour of the late Kamerlingh Onnes by Professor Ernst Cohen. 8 p.m.	Institution of Mechanical Engineers, Storey's Gate, London.
11	Chemical Engineering Group: "Spray Drying." J. Arthur Reavell.	London.
11	Institute of Metals (Sheffield Section): "Bronze." R. T. Rolfe. 7.30 p.m.	University, St. George's Square, Sheffield.
11	Institute of Metals (Swansea Section): "The Design of Annealing Furnaces." J. S. Caswell. 7.15 p.m.	University College, Singleton Park, Swansea.

Hydrogenation of Coal for Oil Production

By Dr. Friederich Bergius

In THE CHEMICAL AGE *of December 25, 1926, there appeared a paper on the "Synthesis of Petroleum," read by Dr. Franz Fischer at the International Conference on Bituminous Coal held in Pittsburgh last November. Below are given the more important parts of the address delivered by Dr. Bergius at the same conference.*

FOR more than a decade attention has been turned in Europe to the problem of making oil out of coal. Europe's oil supply, unlike America's, has become limited. In the days before the great development of the present motor-combustion transportation, Galicia, Rumania, and Russia supplied the European demand for oil, and the producers' only problem was to create a market for it. In the years of the war and those following, conditions in Europe were completely changed. Europeans saw with great concern the shutting-off of their oil-supply from other continents because of the enormous growth of domestic consumption at the source, and a future in which they were liable to be shut off entirely. America is far better off, in the international picture, than Europe. From the situation that exists to-day, it is easy to understand why the replacement of natural oil by an artificial substitute is one of Europe's most serious industrial and economic problems.

Attempted Solution of the Oil Problem

The only raw material that can be used for such an industrial process is coal or a similar carbonaceous material. Three different lines of work, differing in principle, have been followed in solving this problem. The oldest is a continuation and perfection of the well-known coal distillation process, usually called low-temperature distillation. There is no doubt that some of the processes of low-temperature distillation that have been worked out are admirably designed and adequate. But, as in these processes oil is merely derived as a by-product, it is not likely that the quantity of oil recovered will ever figure in increasing the oil supply of the world to any great extent.

Regarding the first of the three methods, my opinion is, that coal distillation at high and low temperatures is important from the standpoint of utilisation of coal, but of no big importance from the standpoint of a future oil supply. Before taking up the historically second of the three methods, the question of direct liquefaction of coal by means of hydrogenation, I want to say something about the third, the synthetical manufacture of oils out of coal products, the building up of hydrocarbons from their chemical elements. A direct synthesis of hydrocarbons from carbon and hydrogen is possible but not of interest from the industrial standpoint. More than 12 years ago a patent application was taken out by the Badische-Anilin-und-Sodafabrik to cover a new reaction for synthesising hydrocarbon compounds. As a raw material carbon monoxide was used, which under high pressure and in presence of certain catalysts, combines with hydrogen to form hydrocarbons and hydrocarbon-oxygen compounds. On the basis of this reaction, first described by the Badische-Anilin-und-Sodafabrik, Franz Fischer in Germany, and General Patart and M. Audibert in France, have carried on considerable research and technical work to build up a process for the synthesis of motor-fuel out of carbon monoxide and hydrogen.

There is no doubt that, from the chemical and technical standpoint, this synthesis may be carried out successfully. The fact that the Badische-Anilin-und-Sodafabrik uses this process only for the production of methanol and high-value alcohols and not for making motor fuel, seems to question the economic possibility of making motor fuel cheap enough by means of this reaction. A new proposal to carry through this reaction under normal pressure conditions, instead of high, seems to hold no more economic advantage to those who have learned the advantages of high-pressure methods for carrying through chemical processes in which large quantities of gases are used.

Conserving the Hydrogen in Coal

Natural coal and lignite are built up from two sorts of chemical compounds, one, the carbonaceous part, which is derived from the cellulose and the lignine part of plants that formed the geological deposits, and the second, the bituminous part, derived from fats, albuminous material, resins, waxes, and other accessory material. The carbonaceous material contains hydrogen, carbon, and oxygen; the bituminous matter, a higher hydrogen content and a lower oxygen content. Considering that in a normal bituminous coal the ratio between carbon and hydrogen is about 16 to 1, and in a liquid oil about 8 to 1, it follows that in order to transform coal into oil, the hydrogen quantity has to be doubled. It is important to conserve as much as possible of the original hydrogen content of the coal. But the distillation process, as well as the synthetical process, works precisely in the opposite direction. The distillation process delivers fairly large quantities of free hydrogen out of coal; the synthetical process separates the hydrogen and the carbon completely. From the fact that hydrogen production means coal consumption, or consumption of energy in any other form, and that for making one weight-unit of hydrogen at least eight weight units of coke are necessary, it is evident that, from the standpoint of conservation of energy, it is most important to conserve the hydrogen bound to the carbon of the coal as much as possible while transforming coal into liquid hydrocarbons.

It is with this point in mind that the direct hydrogenation and liquefaction process of coal has been considered, planned, and developed. In the year 1913, in my laboratory in Hanover, the direct addition of hydrogen to coal was first carried out. We called this reaction the coal-liquefaction process. Using the pre-formed hydrogen-carbon compounds of the coal, it was the intention to add the lacking quantity of hydrogen necessary for transformation of the coal into oil. We proceeded to study the reaction of transforming cellulose and wood into coal by a special method. The synthetical coal produced was very similar to the natural product. By controlling the products and the reaction conditions, I formed an idea of the chemical structure of the chief reaction product, coal. I never published the constitutional formula which I had in mind when carrying out this research, because it was then only an hypothesis for working, and not easy to prove to a chemist as a tenable scientific theory.

First Experiments on Hydrogenation

At this time (1913) the catalytic hydrogenation of unsaturated compounds was being used in chemical laboratories and in chemical technique. But it was evident that a catalytic process could not be used for material like coal, with the limited knowledge of catalysts known at that time. Moreover, hydrogen did not react with coal under normal conditions and at temperatures at which coal was not totally decomposed. We discovered that under certain conditions, the effect of catalysts may be replaced by a very high concentration of the reacting gas, and we could realise the reaction by means of hydrogen under very high pressure. In the laboratory work, great difficulties arose as soon as larger quantities were used for the reaction. Our first method no longer produced a solid hydrogen-oil material as a reaction product, but a coke-like substance. The reason for this disturbing factor was found to lie in the fact that the hydrogenation reaction produced a large amount of heat, which could only be led off with difficulty from the system of gases and solid material. We could overcome this new difficulty by carrying out the reaction in presence of a liquid medium, practically a coal oil, which, suspending the coal, avoids superheating.

We realised soon that liquefaction of coal involves, more or less, a competition between two reactions—the reaction of hydrogen addition to the coal substance, and the reaction of destructive distillation of coal. Within a certain range of temperature the velocity of hydrogenation reaction is greater than the velocity of the coking reaction. At higher temperatures the coking reaction is faster and results finally in the formation of coke instead of oil. The hydrogenation of coal begins at relatively low temperatures. Treated for some hours at a temperature of 300–350° C. the product is still solid but it has taken up a fairly large amount of hydrogen, and is transformed into a sort of pitch with a fairly high melting point. This product becomes liquid if treatment is continued at a temperature of 420° C. From these facts it is

readily understood that the coal liquefaction reaction process consists of two different reactions, the first, hydrogen addition, and the second, the splitting up of large molecules into smaller ones while new hydrogen is added.

Beginning with methane, up to the highest hydrocarbon compounds, typical representatives of the aliphatic, aromatic, and hydro-aromatic series are in the coal-liquefaction products, except of course, the unsaturated compounds, which cannot be formed in the presence of high-pressure hydrogen. Besides these chemical compounds those of phenolic character, chiefly cresol, and ammonia, are among the products.

Different Varieties of Coal Used

One of the most important questions of the chemical research work was to find out which quality of coal could be treated by the liquefaction-method with best results. A very large number of coals and lignites were studied in thousands of experiments. This study included nearly every sort of coal and lignite, except anthracite, from most parts of the world. Lignites have a little greater reaction velocity and are liquefied more completely than bituminous, leaving only about 10 per cent. of untransformed material, depending on the temperature used. About 50 per cent. of the nitrogen of the coal is transformed into ammonia. The rest is found in the form of an organic base in the liquid products. The greatest part of the sulphur of the coal is transformed into hydrogen sulphide. The experiments showed that the yield in oil varies from 40 to 70—according to the various sorts of coal. All these calculations are based on the percentage of weight on the coal introduced into the apparatus. In other words, one short ton of coal yields 107–185 gallons of oil. These figures are based on normal ash-containing samples.

Only anthracites, the real anthracites, and those also which consist chiefly of fusain material, cannot be hydrogenated. For any other sort of coal, including lignites, the hydrogenation reaction is applicable. The average output is between 40 and 70 per cent. when the ash contained is not higher than 10 per cent. and the water contained is not higher than 5 per cent. If the ash content is much higher, obviously the oil output is correspondingly lower.

The products of the liquefaction process are quite different from the tars which are produced by distilling coal at high or low temperatures. (Editor's Note :—A slide was here shown giving a chart showing the various products derived from an average coal by the hydrogenation method. One thousand kilos of coal give 150 kilos of marketable gasoline, 200 kilos of a middle-fraction including gasoline and impregnating oil and a residue from which 60 kilos of lubricating oil and 80 kilos of fuel oil can be obtained. Calculated in short tons and gallons, one short ton of bituminous coal delivers about 45 gallons of gasoline, with an end point of about 437° F.) The gasoline fraction contains a very large quantity of aromatic and hydro-aromatic compounds and acts in a motor like a mixture of benzol and gasoline, eliminating knocking. When diluted with normal gasoline, a non-knocking motor fuel is produced.

The recovery of good lubricating oils was very difficult, but during the past year, in our laboratory as well as in the laboratory of the well-known German Tar-Combine, the Gesellschaft-Fur-Teer-Verwertung, under the guidance of Dr. Spilker, good lubricating materials were produced out of the coal oils.

Development of High Pressure Apparatus

Already in the early stage of our research work we had to develop methods for carrying through the coal liquefaction in a continuous apparatus. The main problem lay in feeding a solid material like coal into the high-pressure apparatus, and in extracting in the same way the inorganic residues and the small percentage of untransformed coal which remained. The coal is ground into small pieces not exceeding 2 mm. in diameter and is mixed with the heavy part of the oil from a prior operation, to a pasty, thick mass. The material in this form can be easily forced by especially designed pumps into the high-pressure vessels, in which the paste is heated together with the oil already contained in the vessel, to reaction temperature. Hydrogen is pumped in at the same side of the vessel, which is equipped with a stirring rod. The reaction vessels can be combined. The whole of the reaction mass—gas, liquefied coal, untransformed coal and ashes, is drawn out of the vessel and after cooling and reducing the pressure, the gas is separated from the liquid and solid material. The medium-sized experimental plant which is used to-day for studying different sorts of coal, has a capacity of two short tons in 24 hours. We have two such units in our experimental station in Mannheim-Rheinau, another is being erected by the Fuel Research Board of the British Government.

In 1916 we began the erection of a bigger apparatus for working under high pressure and with temperatures ranging from 400 to 500° Centigrade. A pressure of at least 150 atmospheres, or better, 200 atmospheres or a pressure of 2,200 to 3,000 pounds per square inch, is necessary. The method of working this big apparatus is principally the same as that in the experimental station referred to before. Heating of such apparatus outside of the walls is impossible because the strength of the iron walls at working temperature is not very high, and even requires measures to protect the walls from super-heating. The new heating arrangement especially worked out for this process consists in using as a heat transfer medium a compressed gas chemically indifferent, such as carbon dioxide or nitrogen, which is circulated by a pressure-pump. Through heat exchange between this cool gas and the hot reaction product, the latter is cooled, while the gas is heated. After having obtained the final necessary temperature in a special furnace, the heat-exchange gas enters the mantle surrounding the reaction chamber and returns to the circulating pump without being expanded. This heating arrangement allows a very economic control of heat and temperatures because practically all of the heat is recovered.

Nature of the Raw Materials

Raw material is coal or lignite. As coal must be used in ground form it is obviously practical to utilise the fine coal and screenings which are nearly waste products. If a coal contains very large quantities of ash or fusain, washing-off by flotation will render it usable for the process. The second raw material used in the process is hydrogen, and in the production of this material lies the fundamental point of the economy of the process. If coal liquefaction had to depend on the usual hydrogen-manufacturing processes for its supply, then it would be difficult to make oil in competition with the natural product. Coal will react with hydrogen, if the latter is in a mixture with other gases, as long as a sufficient concentration of hydrogen is present. On this basis, a new hydrogen process has been developed for coal liquefaction. It consists in heating the gaseous reaction products in the presence of steam whereby the needed hydrogen is regenerated.

The chemical basis of this hydrogen process is the reaction between methane and water. At a temperature of about 1100° C., one molecule of methane reacts with one molecule of water to give three molecules of hydrogen and one molecule of carbon monoxide. The latter is transformed by the action of another molecule of steam at a temperature of about 700° C., in the presence of a catalyst, into carbon dioxide and hydrogen, so that the total effect of the reaction is a transformation of one molecule of methane into four molecules of hydrogen, theoretically. Quite similar is the reaction with ethane and steam. By this means it has become possible to make a sufficient quantity of hydrogen out of the reaction-gases to sustain the process. Besides the coal used for the reaction, there was obviously a quantity of coal necessary for heating and for making the power necessary to compress the hydrogen. It will be possible, in developing the process, to economise more heat and power, and to decrease the quantities of coal used in the process now.

In a long period of years and after spending some millions of dollars in a research station, employing on the average 150 men, the coal liquefaction process was worked out in a technically practicable and economically satisfactory form. After this point was reached in the last year, it became possible to begin the erection of two big factories for coal liquefaction in Germany: one in the lignite territory under the auspices of the dyestuff group, especially the Badische-Anilin-und-Sodafabrik, the other in the Ruhr territory by the Gesellschaft fur Teer Verwertung under the management of Dr. Spilker. The total production of both these factories will be nearly one million barrels a year of the different oily products out of coal.

Question of Gas Production

About 15 to 20 per cent. of the coal fed into the apparatus was converted into methane and ethane. Expressed in caloric value, the gas produced by the coal liquefaction process is equivalent to the gas obtained from coal by the ordinary coking

process for the production of lighting gas. In other words, a coal-liquefaction plant can well be looked upon as a highly improved ordinary gas plant, for the simple reason that the gas produced has the same caloric value, while our by-product, namely, oil, is worth considerably more than the coke of the ordinary gas plant.

In addition to the more valuable by-product we have another advantage of great economical importance inasmuch as we can use an inferior and, therefore, cheaper coal than the one required by the ordinary gas plant. In this case, of course, part of the coke produced by coke oven or low-temperature distillation plant has to be set aside for supplying the hydrogen necessary for liquefaction. The combination of the existing form of gas plants with hydrogenation plants presents great promise.

Pharmaceutical "Analysts"

To the Editor of THE CHEMICAL AGE.

SIR,—

> "Standing at the bar of the Revolutionary Tribunal Danton, when asked his name, answered tersely: 'You will find it inscribed in the Scroll of Fame; it is pretty well known in the Revolution.'"—
> *History of French Revolution.*

"Consulting Chemist and Analyst" wishes to be enlightened about pharmacists. May I introduce Scheele, a name pretty well known in chemistry; a pill puncher who refused the job of senior analyst to the King of Sweden, a position which carried greater honour and more prestige than any similar appointment in a modern democracy. He succumbed in the prime of life to matrimony and prussic acid, leaving behind fame and services rendered to mankind unsurpassed by any Home Office analyst yet born here or elsewhere; Runge, the discoverer of aniline and carbolic acid, who introduced for the first time physiological tests, and was presented by his friend, the great Goethe, with coffee beans, which led him to the discovery of caffein; Deveaux, Napoleon's pharmacist, who isolated tannin from galls; Vaquelin, benzoic acid from wine; Pelletier, quinine, cinchonine, brucine, strychnine, and veratrin; Liebig discovered chloroform, chloral, etc.; Gerrard, pilocarpin; Grove, aconitin; Alms, a mere chemist's assistant, discovered santonin. What about Berthelot, Fresenius, Parmentier, Labarraque, etc., trained pharmacists all? Your correspondent mentions F.R.S. Well, how about Sir Joseph Swan, electric lamp inventor, Professor Tilden, Sir Boverton Redwood, Sir Humphry Davy, Daniel Hanbury, Sir David Brewster, and the present vice-chancellor of the London University? As an analyst your correspondent cannot plead ignorance that Mohr, a mere pharmacist, developed volumetric analysis, designed the corkborer and the balance for specific gravity. He certainly stares daily at the name of yet another pill puncher, Fehling, who presented us with the glucose test. He may have heard of Ludwig and Reichardt if he knows anything about water analysis. We may remind him of Henry Rose, Lassaigne, Millon, Mayer, Dahlen, and so on. All over the British Empire the chief wholesale drug houses employ pharmacists as analysts. As for pedigree and services rendered to humanity and the advancement of science, the pharmacist stands *primus inter pares* and *nulli secundus*. As a parting nosegay to your correspondent may I mention that Ibsen, Suderman, and O. Henry were all complete pharmacists from head to foot; while Goethe was an honorary member of the Pharmaceutical Society of North Germany. We need not stress the fact that progress in modern chemistry is due mainly to team work; and it is only accidentally that pioneers come into the limelight.—Yours, etc.

CAROL A. COFMAN-NICORESTI.

Ashmoor, Hermon Hill,
Snaresbrook, E.
January 31.

Cast Iron Enamelled Chemical Plant

UNDER this heading, in the last issue of THE CHEMICAL AGE, attention was drawn to products of Danto-Rogeat and Co., of Lyons. We have been asked to state that the distribution of this company's goods in Great Britain is controlled by H. Sloog, of 45, Great Marlborough Street, London.

Registration of Engineers

An Important Issue

AT a meeting of the Institution of Production Engineers on Thursday, January 27, Mr. R. Hazleton, secretary of the Society of Technical Engineers, explained the aims of the Bill for the Registration of Engineers which was being introduced again in this session of Parliament—subject to good fortune in the matter of the members ballot for private bills—and also the objects which the Society had in view. The Bill was formally introduced last Session although it was not anticipated that any progress would be made with it. On the general question of the desirability of registration for engineers as a means of improving their status and also protecting the public, Mr. Hazleton said he did not believe there was any difference of opinion among engineers and he agreed that it was on the details of any measure for securing this end that a scheme of this nature was likely to meet with serious opposition. He reminded his audience that the Bill of the Institution of Civil Engineers, which was introduced about five years ago and was eventually withdrawn, practically provided that the Council of the Institution of Civil Engineers should be the registration authority and it was because the other leading engineering institutions objected to this that the scheme failed.

Points in the Bill

The general scheme of the Bill, as now drafted in a preliminary and tentative form for the purpose of discussion and final revision, was that there should be a General Registration Authority but that the councils of the various engineering institutions scheduled to the Bill—no list has yet been drawn up—should act as the registration authority for their particular members. A registration fee of £4 per annum was suggested, of which £1 would go to the Central Registration Authority and the remaining £3 would go to the particular institution of which the member became a registered member. The proposal in the Bill was that the Central or General Engineering Council should consist of representatives of the Government, of the Services, the scientific institutions, the universities, the technical colleges, the engineering employers' organisations and also the engineering employees' organisations. Generally the Bill had been framed on the model of the constitution governing the General Medical Council, with modifications to fit the conditions of engineering.

The Position in Other Countries

In again appealing to the large engineering institutions actively to take up this question of registration, Mr. Hazleton referred to the position in this respect in other countries. For several years, he said, registration of engineers has been the law of the land in many of the States of America. In New York, for instance, a very strict code was in force and nobody was allowed to practise as an engineer or to claim to practise engineering unless registered. A similar measure had been in force in Italy for two years. Actually the scheme in Italy has been operative since the beginning of last year and it was worked through regional councils and a head council at Rome. In New Zealand registration of engineers came into operation at the middle of last year. Australia had not yet attempted legislation, said Mr. Hazleton, but the leading institution of engineers in that country had been in communication with the Society of Technical Engineers here and had stated that it was preparing a measure for presentation to the Commonwealth Government.

The Bill of the Society of Technical Engineers provides for fines and/or imprisonment in the event of an unregistered person practising as an engineer, but, in the course of the discussion, Mr. Hazleton agreed that imprisonment might very well come out and, as already mentioned, he emphasised that the proposals of the Bill were put forward as a basis for discussion and not as final proposals. He stressed the fact that a Bill for the Registration of Architects was being presented to Parliament this session. Incidentally, Mr. Hazleton mentioned that last year the various Government departments accepted the principle of the Bill and it had been arranged that there should be no Government opposition to its introduction.

Graphite Greases

By Antony Seton

THE lubricating qualities of graphite have been known for a very long time, and it possesses certain advantages of form which make it preferable to other lubricants for certain classes of bearing surfaces. Graphite when bought in the flake form, and not as "deflocculated graphite," should have an unctuous feeling, and should be free from mineral impurities of an abrasive nature. Mica is a natural adulterant of graphite, and as it possesses some lubricating properties itself, its presence in small quantity is not objectionable. The presence of hard silicates or of silica, however, leads to trouble with scored bearings, which may soon become badly damaged. A piece of graphite may be compared to a pack of cards upon which vertical pressure makes very little impression, but which gives way to a small side pressure, the cards sliding upon one another. This is precisely what happens with a piece of good graphite: under pressure, the particles cleave and form laminæ which slide over one another with the minimum of friction. These laminæ cling to the surface of the bearing in much the same way that confetti clings to a floor when it is being brushed. Inequalities and imperfections in the surface thus are filled up, and a skin of graphite is formed which is perfectly smooth, and which, moreover, is so hard that only mechanical removal by filing or cutting is possible.

As graphite has a higher specific gravity than oil, it is not possible to make oil suspensions of it, unless it has been through the Acheson process and has been deflocculated. It is usual, therefore, to mix the graphite with grease if it cannot be used alone, and as the grease mixture is usually too thick for economical use, it is thinned down with an oil. The nature of the grease depends to some extent upon the type of work for which it is intended, as certain conditions require a different compound from others. For a fulcrum point used intermittently but fairly frequently, a number of mixtures were tried. A compound was needed which would not wash out (the bearing being exposed to the weather) and which would remain sufficiently soft to act efficiently over a lengthy period. Soap, a proprietary grease, and paraffin wax were tried as vehicles. The grease gave a mixture that was too soft, and not sufficiently adherent. The soap gave a good mixture, but a better one was obtained on mixing 70 parts of graphite with 12 parts of wax. This composition was hard and even, and gave complete satisfaction in use.

For quick-moving parts a mixture of equal proportions of tallow and graphite has been recommended, but the acidity of tallow, which increases with age, renders its use a step of doubtful wisdom. A foreign specification for graphite grease required one part of graphite (amorphous) to two parts of an homogeneous mixture of a mineral grease and a metallic soap. It is not clear what was meant by "amorphous" graphite. If by it was understood "deflocculated graphite," then the mixture would be satisfactory, but if anything of the nature of ground gas carbon or carbon black was intended, the resulting compound was not likely to be any better than an ordinary black grease. Proprietary graphite pastes and greases differ very little in composition, but considerably in the proportions of the ingredients. Nearly all of them are composed of a mineral lubricating oil with a small quantity of lime soap and a small amount of graphite of varying quality. Some samples which were examined gave the following proximate analyses:—

	I.	II.	III.	IV.	
	Per Cent.				
Hydrocarbon oil ..	54	61	68	64	(Jelly)
Lime soap	18	11	11	—	
Calcium carbonate ..	2·5	8	0·5	—	
Graphite	8	5	6·5	8	
Fatty oil	11	8	6	12	
Water and volatile matter	6·5	7	8	—	
Mineral matter	—	—	—	16	

Number IV was the only one of a larger number of greases examined that contained an undesirable amount of mineral matter. In the others it was very small in amount, and is included with the figure for graphite, but in No. IV the quantity present showed that a very low grade graphite had been used. This grease also was peculiar in that the vehicle was not oil and soap, but petroleum jelly, which is not a remarkably good lubricant, though the addition of graphite improves it. The oil in these samples, which were fairly representative, was of the nature of a light lubricating oil. In some greases, the oil is slightly heavier, and in some lighter, and it is worthy of note that paraffin, which is useless ordinarily as a lubricant, becomes fairly satisfactory when mixed with oildag.

In the form of a very thin grease or even partly in suspension in a liquid, graphite finds application in jointing compositions for screwed pipe joints. The function of the graphite is to make the nipples run easily, and to make it easier to break down the joint after a lengthy period if necessary. One such composition was a thick cream, and contained nearly 25 per cent. of graphite and about an equal amount of manganese dioxide. The vehicle was linseed oil, and the rather annoying propensity of manganese dioxide in oil to form an unbreakable joint was lessened by the presence of the graphite. For leaf springs a preparation that was examined contained only 4½ per cent. of graphite, 30 per cent. of spindle oil, while the remainder was a light spirit like benzine. Being very thin, the preparation would certainly perform its mission, which was to interpenetrate the leaves and by leaving a film of oil and graphite to render rusting impossible. At the same time, the flashpoint of the preparation was very low, which made it dangerous in use. An equally satisfactory composition could have been made using carbon tetrachloride instead of benzine.

Any good graphite preparation is perfectly homogeneous, no light oil separates on standing, and there is no gritty feeling when a small quantity is rubbed between the fingers. If this simple test indicates the presence of hard grains, the grease should be rejected as likely to cause trouble.

The Function of Vitamins

An Address by Professor Ling

PROFESSOR A. R. LING, president of the Birmingham University Biochemical Society, gave his presidential address on Thursday, January 27, taking for his subject "Accessory Agents in Biochemical and Physiological Reactions." Professor Ling dealt with the subject of hormones, vitamins, and enzymes from the point of view of a chemist. Hormones, he pointed out, were the endogenous drugs secreted by special glands, from whence they were conveyed to the blood stream. They are present in extremely small amount in the animal tissue, but one at least has been synthesised so that it could be produced in the laboratory. The action of these substances was so powerful that it exceeded that of many of the most powerful alkaloids. The hormones from the suprarenal gland, the thyroid gland, and the pituitary gland were all concerned in promoting the mobilisation of glucose from the glycogen deposited in the liver. The hormone from the pancreas, which was known as insulin, on the other hand, acted in the opposite direction in promoting the storage of sugar as glycogen in the liver. Vitamins were substances present in small quantities in various foods, in the absence of which normal physiological changes altered. Five of these substances had been recognised: (1) A substance present in cod liver oil, cream, and green vegetables, but absent from vegetable oils; this was the growth factor; (*b*) a substance soluble in water, present in seed embryos, yeast, nuts, milk, and meat; without this vitamin animals developed polyneuritis; (*c*) a substance soluble in water, present in cabbage, lemon and orange juice, meat and milk, without which human beings developed scurvy; (*d*) a substance present in cod liver oil, cream, and green vegetables: this was produced in the animal body by the effect of sunshine, and also formed in substances not containing it when they were irradiated by ultra-violet light: absence of this from the diet led to the development of rickets; (*e*) a substance present in wheat embryos and lettuce; this was the anti-sterility vitamin.

Synthetic Ammonia

IN regard to the developments of the Billingham works of Synthetic Ammonia and Nitrates, Ltd., it is reported that for some time a daily output of 50 tons of ammonia has been obtained, but extensions are now being carried out which, when completed in June, will increase the daily output to 215 tons of ammonia, equivalent to about 850 tons of sulphate of ammonia.

Indian Chemical Notes

(From Our Indian Correspondent.)

At the recent Agricultural Show organised at Poona, there was a special court known as the Fertilisers' Court where several kinds of fertilisers which have proved successful in the various parts of India were displayed. The most important of these was calcium cyanamide, which has given excellent results so far in Madras and Bombay. At the Ganeshkhind gardens, Poona, it has been shown that the use of 2 cwt. per acre on maize has given a clear increase of Rs. 32 an acre over unfertilised crop. Charts were displayed showing how this fertiliser was extensively used in all parts of the world, and also how it provides the cheapest nitrogen unit of any known fertiliser in regular use in India. The percentage of essential nitrogen available is 19. In South India and Ceylon this fertiliser is now being increasingly used for tea, coffee, and rubber, and it is also found excellent for crops such as cotton, rice, tobacco, and bajri.

Okha Salt Works

The proposed company for the manufacture of salt at Okha, near Dwarka in the Baroda territory, has now been formed with a capital of Rs. 10 lakhs, and the works are now being laid out on the most modern lines, and will be completed within six months. The main object of this concern is to produce salt of good quality for consumption in Bengal, Bihar, and Assam. In these provinces it has not yet been found feasible to manufacture salt locally owing to various difficulties, and the result is that the whole of the salt consumed is imported into India from foreign countries. These imports in 1925-26 amounted to 560,000 tons, of which Bengal alone took 480,000 tons. Of the principal suppliers of this imported salt, the United Kingdom's share was 104,000 tons, Aden's 184,000 tons, and Egypt's 118,000 tons. The works now being laid out will be capable of producing the whole of the quantity of salt required in these provinces, but this capacity will be developed gradually, the quantity expected to be produced in the first year being about one-sixth of the demand. The salt-producing conditions are said to be excellent. It is also proposed to attempt to recover the various valuable by-products of salt.

Burma Minerals

According to the report on Burma mines for the year 1925, the total value of all minerals and mineral oil obtained during the year in Burma amounted in value to Rs. 14 crores. The production of ore by the Burma Corporation from the Bawdwin Mines reached 321,000 tons, which is an increase of 34,000 tons over the previous year. The Corporation's smelting and refinery operations resulted in a production of 46,000 tons of refined lead, 1,100 tons of antimonial lead, 16,800 tons of zinc concentrates, and 4·8 million troy ounces of refined silver. The ruby mines at Sinkwa were closed during the year. The best parts of the alluvial workings of the Mogok and Kathe valleys are reported to be approaching exhaustion, and the residue of ruby-bearing ground in these areas is said to be insufficiently rich to pay for extensive working. These mines are now let out to tributors, who are engaged in cleaning up patches of ruby-earth left in crevices and detached spots.

Imports of Dyes

Imports of dyeing and tanning substances into Bombay during the year 1925-26 showed a large drop in the total value, from Rs. 218 lakhs to Rs. 126 lakhs. This drop is almost entirely accounted for by a marked decrease in the importation of synthetic dyes from Germany. Imports of alizarine dyes fell by 4¼ million lb. to 959,000 lb. in quantity. Imports of aniline dyes dropped by 2¼ million lb. to 6¾ million lb. Germany was the chief loser, together with Belgium and the Netherlands, while supplies from the United States of America, Switzerland, and the United Kingdom showed appreciable improvements.

Imports of Artificial Silk

During the six months from April to September, 1926, the imports of artificial silk into India showed a considerable advance, and amounted in value to Rs. 185 lakhs as against Rs. 93 lakhs in the corresponding period of the previous year. Silk yarn increased from 991,000 lb. to 1·9 million lb., and piece goods mixed with cotton increased from 6 million yds. to 19 million yds., of which 8 million yds. were supplied by the United Kingdom and 6 million yds. by Italy. The shares of these countries in the previous year's corresponding period were 2·7 and 1·8 million yds. respectively.

Film Lectures to Farmers

A series of four film lectures on "manuring" in connection with the Agricultural Discussion Societies, has just been given in Devonshire by Mr. G. A. Cowie, M.A., B.Sc., F.I.C., chief agricultural adviser to the Potash Syndicate. The centres were Barnstaple, Cullompton, Axminster and Crediton. There was a total attendance of over 300 farmers present at these meetings. In introducing the subject the lecturer emphasised the fact that there was still a wide gulf between the research station and the general farmer, and considered that the cinema film could play an important part in bridging this gulf by bringing the results of researches and experiments down to the farmer in a way in which he could understand them and adapt the lessons to his own practice.

If, Mr. Cowie suggested, the farmer would give as much attention to the manuring of his crops as he gave to the feeding of his stock, especially in the way of studying the question of balance, he would find that his bank balance would not be so low as it was to-day in many cases. The nitrogen and potash ratio in manuring was an important factor in relation both to the health of the crop and the yield, and every care should be taken to work out this ratio to suit best the requirements of the crop. Economy in the use of fertilisers, which many farmers were attempting to-day, was a ruinous policy, because the removal of crops from ground that was not fertilised, caused a drain upon the capital resources of the soil which had to be restored sooner or later at a much higher cost.

Artificial Silk from Esparto

Italian artificial silk manufacturers are said to be investigating the possibility of using esparto pulp as a raw material. The fact that paper could be made from esparto pulp encouraged the makers of silk pulp to examine possibilities, and it has been found that good pulp can be made. The esparto which abounds in the North of Africa, and is easily obtained by Italian manufacturers, is treated with chlorine, which is a by-product of electrolytic caustic soda. Caustic soda is used in large quantities by silk manufacturers. An artificial silk manufacturer, therefore, who either owns or has a large interest in the plant at which his caustic soda is made, can obtain his chlorine for a nominal figure. By treating esparto with chlorine waste he may obtain a pulp, and thus the economic circle is continued. The rock salt for the electrolytic process of caustic soda manufacture comes from Sicily, and accounts for about 25 per cent. of the total cost. Electric power is obtainable cheaply and labour is less than 5 per cent. of the total costs. From ten tons of caustic soda manufactured, nine tons of chlorine are obtained. A German syndicate intends to exploit this process from esparto grown in Spain, and so far as Italy is concerned the raw material may be obtained from her North African possessions.

Explosion at Chemical Works

One man was killed and two others were seriously injured in an explosion on Monday at the Hendon Chemical Works, Renters Avenue, Hendon, occupied by Johnson and Sons, Ltd. The man killed was W. Jarrett, of Rork Road, Ilford. The injured, both of whom were removed to Hendon Cottage Hospital suffering from severe burns, are Arthur Hills, 36, of The Burroughs, Hendon, and Leonard Garrett, of Paul Street, Stratford. The explosion occurred about half-past one in a still house in which only the three men named were working. The building, measuring about fifty-four feet by twenty-seven feet, was damaged by the explosion, part of the roof being blown off, but there was no outbreak of fire. Hills, on being taken to the hospital, was still conscious, but he could throw little light on the affair. He said that he was working upon a special order, making up some chemicals, when there was a terrific explosion. He could not say what caused it. He and two other men were thrown across the room.

Bankruptcy of Dye and Chemical Merchant

THE statutory first meeting of the creditors of Ernest George Sawyer, dye and chemical merchant, of 110, Fenchurch Street, London, E.C., and late of Orchard Street, Pendleton, near Manchester, was held on Monday at Bankruptcy Buildings, Carey Street, London, W.C., the debtor having filed his petition on January 19. He returned his liabilities at £27,176, of which £10,776 were treated as expected to rank, and his assets valued at £7,870 net, after the deduction of £410 in respect of preferential payments. A deficiency of £2,906 is disclosed. According to the statements that have been made by the debtor in the course of a preliminary examination, before January, 1923, he acted as a director of an oil brokering company in the City at a salary of £1,000 as departmental manager and commission and director's fees amounting to an additional sum of between £5,000 and £7,000 a year. He left the company after nine years' service, and with a capital of £11,000, represented by his savings, began business in 1923 on his own account as a dye and chemical merchant. Since September last, his business had suffered considerably in consequence of the effects of the general strike, but a statement of affairs then prepared showed an estimated surplus in assets of £10,000; but the assets being chiefly dyes were difficult to realise quickly, and he owed a sum of £10,000 to a dye corporation. In consideration of that debt, he assigned certain stock to the corporation under an agreement, and he convened a private meeting of his creditors for January 10, which was adjourned until January 18, in order that an arrangement should be effected with the corporation to enable his friends to come forward and submit some proposal. The corporation, however, so the debtor asserted, was unwilling to cancel the before-mentioned agreement, considering themselves fully secured. The advice of counsel was taken, and the opinion expressed was that the agreement would be void in bankruptcy, and he was advised to file his petition. The debtor attributed his present position to bad trade due to the general and coal strikes, to depreciation of prices, and to lack of capital. It was stated that the court had already made an order adjudging the debtor a bankrupt, and the meeting passed a resolution for the appointment of Mr. W. H. Cork, accountant, of 19, Eastcheap, London, E.C., as trustee of the debtor's estate.

Voluntary Liquidation of Oil Importers

A MEETING of the creditors of H. F. Farnan and Co., Ltd., oil importers, of 34, Lime Street, London, was held on Thursday, January 27, at Winchester House, Old Broad Street, London. Mr. E. Cooper occupied the chair, and reported that the ranking liabilities were £101,719, of which £71,658 was due to unsecured trade creditors, and £30,061 represented the unsecured balances due to the bank. The assets totalled £14,503, the deficiency being £87,216. During the last eighteen months, Mr. H. F. Farnan had had nothing whatever to do with the business, he having definitely retired in June, 1925, when he found £20,000 to write off previous losses. A petition had been presented for the compulsory liquidation of the company, and would come before the court in the next week. A resolution was passed confirming the voluntary liquidation of the company with Mr. Cooper as liquidator, whilst an advisory committee of the principal creditors was also appointed.

Dr. Clayton on Fertilisers

DR. CLAYTON, M.P., of the directorate of "I.C.I.," in proposing the "National Farmers' Union" at the annual dinner of the Liverpool and District Farmers' Club, said the Government were seriously considering the suggestion that farmers who wished to buy the land might be assisted with credits, and the Minister of Agriculture had a bill prepared for dealing with this point which had only been delayed by industrial troubles. The Government were also concentrating upon research from an agricultural point of view, and in this direction the big chemical merger recently announced were doing good work. It was the intention of the new combine to concentrate on the supply of chemical fertiliser, and to see that the country had the cheapest chemical fertiliser that could be produced. It was essential if they wanted to get the best out of the land, to have the biggest crops, to have a cheap and efficient substitute for ordinary farmyard manure.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

21 (*Greenbanks Chloride of Lime*).—"Could you let us know the manufacturers of Greenbanks Chloride of Lime?"

22 (*Carbolocene Disinfectant*).—"I should be greatly obliged if you could tell me where I could buy Carbolocene disinfectant as used by hospitals and institutions."

23 (*Zinc Oxide Paints*).—"We should be very much obliged if you would inform us whether you have, or know of any work dealing with the preparation of zinc oxide paints and of black paints."

24 (*Non-drying Adhesive Substance*).—"I should be glad if you could suggest to me substances—crude and cheap and readily obtainable—which I could apply (by dipping) to glass balls on metal pieces or turnings to give them a non-drying sticky surface. I have thought of glycerine, glucose treacle, resinous substances like flycatcher material, oils and greases, but thought that maybe there is some waste or cheap product which would be even more suitable, which I could obtain in fairly large quantities. If it is easily removable by hot soda water so much the better."

25 The inventor of an emulsifying machine (*colloid mill*) desires to be put in touch with any interests who would be prepared to assist him in placing the machine on the market.

Replies

5 (*Chromate of Iron*).—J. Sherman and Co., Ltd., Downham Mills, Chestnut Road, Tottenham, London, inform us that they are in a position to supply chromate of iron.

18 (*Sodium Cyanide*).—The Cassel Cyanide Co., Ltd., Glasgow, inform us that they are the largest manufacturers of high grade sodium cyanide.

20 ("*Endura*" *and* "*Beacon*").—We understand that the "Endura" trade mark is owned by Thomas de la Rue, of London, and the "Beacon" by the Streetley Manufacturing Co., Birmingham.

21 (*Greenbanks Chloride of Lime*).—This substance may be obtained from the United Alkali Co., Ltd., Liverpool.

23 (*Zinc Oxide Paints*).—The following books deal with the preparation of zinc oxide paints and of black paints:—"Blacks and Pitches," by H. Langton (Ernest Benn, Ltd.), 15s.; "Zinc Oxide," by Dalton B. Faloon (Constable and Co., Ltd.), 12s.; "Preparation and Uses of White Zinc Paint," by P. Fleury, translated by Donald French (Scott Greenwood).

New President of American Chemical Society

THE American Chemical Society has elected Dr. G. D. Rosengarten, of Philadelphia, to be its president for 1927. He succeeds Professor J. F. Norris, who has served two terms and was therefore not eligible for re-election. Dr. Rosengarten was born in Philadelphia in 1869, and graduated B.Sc. in the University of Pennsylvania in 1890. He has been vice-president of the Powers-Weightman-Rosengarten Co. since 1905, and has long been active in the Philadelphia Section of the American Chemical Society. During 1911 and 1912 he was chairman of the Division of Industrial and Engineering Chemistry, and from 1915 to 1922 was a councillor-at-large. He served as chairman of the finance committee of the Golden Jubilee meeting in Philadelphia last September and has been a director of the Society since 1919. He has been serving for some time as a member of the Society's executive committee. In 1915, and again in 1916, Dr. Rosengarten was president of the American Institute of Chemical Engineers. He is a Fellow of the American Academy of Arts and Sciences, a member of the committee of revision of the U.S. Pharmacopœia, of the American Philosophical Society and of the Franklin Institute.

From Week to Week

ONE HUNDRED AND FORTY IRON BLAST-FURNACES are now in blast in this country, as compared with 147 immediately before the strike broke out.

A SERIES OF LECTURES on "Modern Developments in Regard to Fuel" will be given on Monday evenings, commencing February 7, at the Sir John Cass Technical Institute, Jewry Street, Aldgate, London.

THE SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS' ASSOCIATION of the United States has elected Mr. August Merz, of the firm of Heller and Merz, New York, as its president, in the place of Dr. C. H. Herty, resigned.

A FATAL EXPLOSION occurred at a dyeworks at Thaon, France, on Tuesday, killing five men and critically injuring four. The men were engaged in reconstructing the boiler room when a pipe burst, pouring jets of steam upon them.

A CLAIM BY A GERMAN FIRM to recover from the Stanton Ironworks Co., Ltd., £4,196 in respect of pipes seized during the war while in transit to the Argentine, was dismissed by the Anglo-German Arbitral Tribunal recently.

A RESEARCH LABORATORY at a cost of 250,000 dollars will be built at the McGill University, according to a resolution which was unanimously approved at the annual meeting of the Canadian Pulp and Paper Association held recently at Montreal.

JOHN HETHERINGTON AND SONS, textile machinists, who recently concluded an agreement with Messrs. Kohorn, of Vienna, for the manufacture of artificial silk machinery in this country by the Kohorn patents, have secured a contract for the supply of machinery for the Branstone factory to the value of £400,000.

COURTAULDS, LTD., announce that an arrangement has been concluded between the Vereinigte Glanzstoff-Fabriken A.G. of Elberfeld, the Snia-Viscosa of Turin, and themselves for the purpose of bringing about commercial and technical collaboration between the three companies. It is also announced that the Vereinigte Glanzstoff has reached an agreement to co-operate with the Italian firms Seta Artificiale Varedo Ceriano and Aquila.

THE COUNCIL OF UNIVERSITY COLLEGE, LEICESTER, has decided to allocate to the Chemistry and Physics Departments Fund the £3,000 recently given by Mr. Arthur Oram, J.P., of Leicester, thereby bringing the aggregate to £15,000, half the sum required for the endowment of the two departments. Authority has been given for four scholarships of the value of £40 each tenable for three years, in addition to a number of bursaries, to be offered for competition in 1927.

THE CHILIAN NITRATE PRODUCERS' ASSOCIATION has addressed to the Minister of Finance a protest against the proposed increase by 100 per cent. of the export duty on iodine. It is pointed out that iodine, a by-product of nitrates, helps to maintain the nitrate industry of Chile. The value of the yield of iodine is estimated at 1s. per metric quintal of nitrate produced. Under the present conditions of restricted activity the income from iodine is the only source of revenue of many nitrate enterprises.

THE BIRMINGHAM CITY ANALYST, Mr. F. J. Liverseege, in his report to the Public Health Committee for the fourth quarter of last year, states that 1,184 samples were submitted for analysis under the Food and Drugs Acts during the period. Thirty-five samples were found to be adulterated. These had been bought from twenty-two different vendors. The comparative adulteration figure—that is, the number of different vendors selling adulterated samples per 100 samples bought—was 1·8. In the fourth quarters of the previous five years the comparative adulteration figure varied from 0·9 to 4·0.

GOVERNMENT CONTRACTS for December, 1926, included the following:—Admiralty—chemicals, Brunner, Mond and Co., Ltd., Chester; Chance and Hunt, Ltd., St. Helens; F. Allen and Sons (Poplar), Ltd., London; J. Crosfield and Sons, Ltd., London; United Alkali Co., Ltd., London.—War Office—Aluminium ingot, The British Aluminium Co., Ltd., Warrington; copper alloy, James Booth and Co. (1915), Ltd., Birmingham; soap, Joseph Watson and Son, Ltd., Leeds; water softening mixture, Sofnol, Ltd., London.—Crown Agents for the Colonies—Neosalvarsan, A. C. Henry, London; quinine, Howards and Sons, Ltd., London.

THE NON-INFLAMMABLE FILM CO., LTD., published its prospectus during the week. Subscriptions were invited for £500,000 in deferred shares of £1. The prospectus indicates that the directorate includes Sir H. E. Blain, formerly of the London Underground Railways and the London General Omnibus Co., and Dr. A. Levinstein. The consulting chemist is Dr. K. Kieser, late of the Bayer Co., while the technical management is in the hands of the inventor of the non-inflammable film, Mr. H. J. Mallabar, and Dr. F. Westhoff. The company has been formed to take over certain processes in regard to the manufacture of cellulose acetate and its conversion into non-inflammable film, splinterless glass, etc. The company commences with established works at Rickmansworth. A contract has been entered into with British Safety Films, Ltd., for the sale of the company's entire output of positive cinema film for the next seven years.

THE ALLIED CHEMICAL CO., of New York, announces that its new plant at Hopewell, Virginia, for the production of atmospheric nitrogen will shortly commence production.

A FATAL ACCIDENT occurred recently at Melingriffith Tinplate Works, Whitchurch, Hants, one of the operatives having died of burns received through falling into a tank of sulphuric acid.

A POWER EFFICIENCY EXHIBITION will be held in the City Hall, Manchester, from June 22 to July 2. The exhibition is designed to demonstrate the economic value of modern power efficiency machinery and apparatus.

RECENT WILLS INCLUDE: Mr. James W. S. Ashworth, of Radcliffe, Lancs, manufacturing chemist, £64,355; Mr. Charles Andrew Johnstone, of Whaley Bridge, Cheshire, manufacturing pharmaceutical chemist, £22,006.

AN EXPLOSION at the Dowlais Steel Works, Cardiff, on Thursday, January 27, resulted in the death of two men and injuries to six others. The explosion occurred in a stone tower 80 ft. high, controlling the gas and heat in the furnaces.

MR. JOHN A. BENN has been appointed a director of Benn Bros., Ltd., publishers of THE CHEMICAL AGE and a number of other technical journals. Mr. J. A. Benn is a grandson of the late Sir John Benn, who founded the company.

PROFESSOR ERNST COHEN, of Utrecht, will deliver a memorial lecture in honour of the late Kammerlingh Onnes before the Chemical Society, at the Institution of Mechanical Engineers, Storey's Gate, Westminster, London, on Thursday, February 10, at 8 p.m.

THE FOLLOWING APPOINTMENTS to the chemical staff of Armstrong College, Newcastle, as lecturers in chemistry, are announced:—Dr. R. Raper (who has been for three years demonstrator in the chemical laboratory of the University of Cambridge), Dr. R. D. Haworth (who has been demonstrator at Oxford), and Dr. L. A. Sayce.

MR. FRANK HODGES, in the course of a lecture delivered on Monday at King's College for Women, London, on the future of the mining industry, predicted that within ten years the people of this country would regard the burning of new coal in an open grate as wrong. He urged the proper technical and scientific development of the coal industry. The great problem before the latter was the maintenance of its productivity. Coal must be sold on a qualitative basis. German coal exporters were now selling coal on a guaranteed calorific and chemical value, and we would have to do the same.

APPLICATIONS ARE INVITED for the following appointments: Assistant Government Analyst in Nigeria. £600-£30-£720-£40-£920, plus free quarters. The Private Secretary (Appointments), Colonial Office, 38, Old Queen Street, London, S.W.1. March 1.—Lecturer and Demonstrator in Organic Chemistry in the University of Sydney, New South Wales. £350-£40-£700. The Agent-General of New South Wales, Australia House, Strand, London, W.C.2. February 28.—Assistant Chemist under the Northern Coke Research Committee, at Armstrong College. £250. Professor H. V. A. Briscoe, Armstrong College, Newcastle-upon-Tyne. February 7.

BEET SUGAR NEWS.—The Lincolnshire Beet Sugar Co., Ltd., issued its prospectus during the week. Subscriptions were asked for 325,000 7 per cent. cumulative preference shares of £1 each at par. The total capital is £332,500, 150,000 ordinary shares of 1s. having been subscribed for earlier. The company has concluded an agreement with the Société Générale des Industries Agricoles, of France, and Mr. Henry Blaeon, a director of the latter company, is a member of the board of the Lincolnshire concern.—The United East Lothian Agricultural Society reports that the growing of sugar beet in East Lothian in 1926 has proved successful, except in one or two cases.—With regard to the beet sugar factory which is to be erected at Selby, Yorkshire, an appeal was made at the recent annual meeting of the Selby Farmers' Union for more support from the local farmers. Captain W. Jollans, managing director of the Selby Beet Sugar Factory, said that the produce of another thousand acres was required for the factory.—Mr. C. B. Kershaw, appointed as expert adviser by the Ministry of Agriculture and Fisheries, is drafting a report on the prevention of pollution of rivers by effluent from beet sugar factories.

Obituary

MR. D. J. PINKERTON, formerly chief chemist and metallurgist to D. Colville and Sons Ltd., of Motherwell, at Gretna. He retired from active work in 1925.

MR. THOMAS OWENS, aged 74, of Widnes. He came to Widnes from Dublin in the early seventies to work for Mr. James Muspratt, grandfather of Sir Max Muspratt, and retired from his employment at Muspratt's works about 20 years ago.

PROFESSOR CARL GRAEBE, in Frankfurt, on January 19, aged 86, who had made many contributions to the science of organic chemistry. Among the subjects which he had investigated were quinones, and the relation between colour and constitution. Jointly with Carl Liebermann he showed, in 1868, that alizarin, when reduced with zinc dust, yielded anthracene · and in the following year alizarin was synthesised simultaneously by these two German chemists and the late Sir W. H. Perkin.

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Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

263,503. PRODUCTION OF OXYGEN-CONTAINING AND OTHER ORGANIC COMPOUNDS. H. Dreyfus, 8, Waterloo Place, London, S.W.1. Application date, July 1, 1925.

Gaseous mixtures of, or containing, carbon monoxide and hydrogen are subjected to the action of heat in the presence of a catalyst capable of combining carbon monoxide and hydrogen to form methyl alcohol or other oxygenated organic compounds such as formaldehyde, keten, acetic acid, acetone, etc., at ordinary atmospheric pressure. Catalysts which favour the production of methane are avoided. Reference is directed in pursuance of Sec. 7, Sub-sect. 4 of the Patents and Designs Acts, 1907 and 1919, to Specifications 179,951, 157,047, and 108,855.

263,517. ACCELERATORS FOR RUBBER VULCANISATION. E. C. R. Marks, London. From E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. Application date, September 17, 1925.

These accelerators are formed by the interaction of formaldehyde with the condensation products of amines and aldehydes. It has been found that formaldehyde will react with condensation products of aromatic amines and straight chain aldehydes having more than one carbon atom to form complex substances harder than the original condensation products and having a good accelerating power. Rubber vulcanised with this product shows a higher tensile strength. In an example, acetaldehyde is slowly run into aniline in a cooled vessel and the temperature is allowed to rise gradually to 70° C. and the mixture is maintained at 80–85° C. for two hours. Formaldehyde is then added and the temperature rises about 10° C. The mixture is stirred for two hours and then placed under vacuum and the water removed. The melted resin is drawn off, cooled, and then ground. The aniline may be replaced by toluidines, naphthylamines, phenylene-diamines, and other mono- and poly-amines.

263,552. POLYNITROAMINES, PROCESS FOR THE MANUFACTURE OF. W. H. Bentley, "Lynton," Hapton, Burnley, Lancs, and W. Blyth and Co., Ltd., Holland Bank Chemical Works, Church, Lancs. Application date, October 2, 1925.

It is known that polynitro-amino compounds can be obtained by heating polynitro-halogen compounds of the aromatic series with ammonia under pressure, but there is a risk of explosion. It is now found that halogen atoms in polynitro-halogen compounds can be replaced by amino groups by heating with urea in an open vessel. In an example, 1 : 2 : 4-chlordinitrobenzene and urea are gradually heated to 130°–140° C., and the temperature maintained until the mixture contains no chlordinitrobenzene. The product is agitated with hot water and the insoluble portion filtered off, washed and dried, yielding pure 2 : 4 dinitraniline. The urea may be replaced by substances which yield it, such as ammonium cyanate. Examples are also given of the production of 2 : 6-dinitro-4-chloraniline and 2 : 4 : 5 : 7-tetranitro-1-naphthylamine.

263,576. PHOSPHATIC MATERIALS, TREATMENT OF. B. P. Hill and The Blaydon Manure and Alkali Co. (1877), Ltd., Blaydon-on-Tyne, Durham. Application date, October 26, 1925.

In order to obtain phosphorus or phosphoric acid, rock phosphate is powdered, mixed with pulverised coal, and blown through a nozzle into a combustion chamber. Alternatively, the powdered rock phosphate is carried into the combustion chamber by the primary or secondary air which feeds the pulverised coal or oil or gas burner. In a further alternative, the powdered rock phosphate is allowed to fall through a flame. The liquid slag or semi-fused residue is run off, and dust is separated from the gases in a cyclone separator or electrostatic precipitator operated at a temperature above the condensation point of phosphorus vapour. Air may be admitted to convert the phosphorus into its oxide.

263,623. SODIUM FLUORIDE FROM SILICO HYDROFLUORIC ACID, PROCESS FOR MANUFACTURING. W. Siegel, 28, Sybelstrasse, Charlottenburg, Berlin. Application date, January 1, 1926.

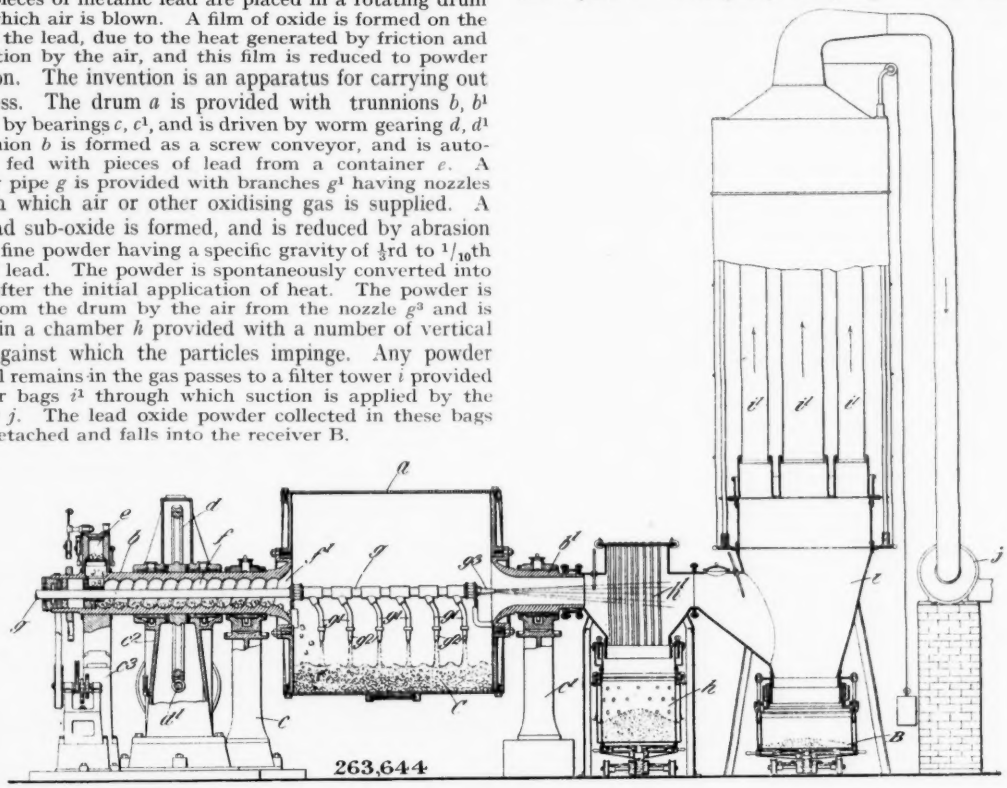
Silico-hydrofluoric acid has been converted into sodium silico-fluoride and the latter decomposed with sodium carbonate to obtain sodium fluoride. In this invention silico-hydrofluoric acid or a salt thereof is treated with suitable potassium compounds to obtain potassium silico-fluoride, which is then treated with sodium carbonate to obtain sodium fluoride and potassium carbonate. The latter is thus obtained as a valuable by-product. The interacting substances may be heated in the dry state, or in solution or suspension in water or in a liquor derived from the process. Alternatively, the potassium silico-fluoride is incompletely decomposed with sodium carbonate so that potassium fluoride is obtained in solution, which can be separated from the sodium fluoride and silicic acid and can be treated with sodium carbonate to obtain sodium fluoride and potassium carbonate which are free from silicic acid. In another alternative, the potassium silico-fluoride is decomposed by potassium carbonate, and the potassium fluoride formed is precipitated from the silicic acid and treated with sodium carbonate to obtain sodium fluoride and potassium carbonate which are free from silicic acid. Part of the potash is then used again for treating fresh potassium silico-fluoride.

263,670. COLLOIDAL OR LIKE MATERIALS, MANUFACTURE OF. W. H. Bentley, "Lynton," Hapton, Burnley, W. M. Coates, 28, Admiral Street, Burnley, and J. Riley and Sons, Ltd., Hapton, Burnley, Lancs. Application date, June 7, 1926.

Colloidal substances are usually obtained by precipitation from solutions in the presence of colloids—*e.g.*, colloidal sulphur is obtained by adding hydrochloric acid to a mixture of calcium polysulphide and glue. The calcium chloride also produced has a deleterious effect when the sulphur is employed for horticultural purposes, and must be removed either by dialysis or by allowing the sulphur to settle, and decanting. In this invention, the colloidal substances are produced by the interaction of substances of such nature and quantity that the solution contains the desired colloid and a reaction product other than water, but contains little or no electrolytes. It is important for horticultural purposes to avoid strong anions, such as Cl, SO_4, or NO_3. In an example, a solution of calcium polysulphide containing glue is treated with gaseous sulphur dioxide or with sulphurous acid. The treatment is stopped when the liquor has become neutral, and the mixture is stirred until free from sulphuretted hydrogen. The product contains colloidal sulphur and insoluble calcium sulphite, the latter being harmless to vegetation. The sulphur dioxide may be replaced by oxalic acid and the calcium polysulphide by barium polysulphide. In another example, potassium polysulphide and silico-fluoric acid are simultaneously run into a solution of glue to obtain a very stable emulsion of colloidal sulphur and potassium silico-fluoride. In another case, colloidal lead arsenate and potassium silico-fluoride are made from potassium arsenate and lead silico-fluoride. In another case, colloidal calcium arsenate is obtained from calcium sucrate and arsenic acid. In all the above cases, colloidal substances are associated only with insoluble materials, but in other cases they may be associated with soluble salts which are weak electrolytes. Thus colloidal sulphur and sodium salicylate or sodium borate are obtained from sodium polysulphide and salicylic acid or boric acid; colloidal sulphur and potassium oleate from potassium polysulphide and oleic acid; colloidal copper arsenate and sodium silico-fluoride from sodium arsenite and copper silico-fluoride.

263,644. CONTINUOUS PRODUCTION OF LEAD OXIDES IN THE DRY STATE, APPARATUS FOR. G. Shimadzu, 420, Funaya Cho, Higashinotoin Oshikoji Sagaru, Kamikyo Ku, Kyoto, Japan. Application date, January 27, 1926.

Specifications Nos. 176,924, 218,119, and 236,368 (see THE CHEMICAL AGE, Vol. VI, p. 525, Vol. XI, p. 123, and Vol. XIII, p. 157) describe the production of finely divided lead oxides from metallic lead. Thus, in Specification No. 218,119, pieces of metallic lead are placed in a rotating drum through which air is blown. A film of oxide is formed on the surface of the lead, due to the heat generated by friction and the oxidation by the air, and this film is reduced to powder by abrasion. The invention is an apparatus for carrying out this process. The drum *a* is provided with trunnions *b*, b^1 supported by bearings *c*, c^1, and is driven by worm gearing *d*, d^1 The trunnion *b* is formed as a screw conveyor, and is automatically fed with pieces of lead from a container *e*. A stationary pipe *g* is provided with branches g^1 having nozzles g^2 through which air or other oxidising gas is supplied. A film of lead sub-oxide is formed, and is reduced by abrasion to a very fine powder having a specific gravity of $\frac{1}{3}$rd to $^1/_{10}$th of that of lead. The powder is spontaneously converted into litharge after the initial application of heat. The powder is ejected from the drum by the air from the nozzle g^3 and is collected in a chamber *h* provided with a number of vertical bars h^1 against which the particles impinge. Any powder which still remains in the gas passes to a filter tower *i* provided with filter bags i^1 through which suction is applied by the exhauster *j*. The lead oxide powder collected in these bags may be detached and falls into the receiver B.



NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE, when they became open to inspection under the International Convention :—244,461 (Soc. de Recherches et d'Exploitations Petrolifères), relating to manufacture of absorbent carbon ; see Vol. XIV, p. 185 ; 251,268 (T. Goldschmidt Akt.-Ges.), relating to ferro-silicon containing valuable metals, see Vol. XV, p. 15 (Metallurgical Section) ; 253,520 (Roessler and Hasslacher Chemical Co.), relating to alkali monoxides, see Vol. XV, p. 209 ; 255,043-7 (H. Suida), relating to production of concentrated acetic acid from dilute aqueous or crude pyroligneous acid, see Vol. XV, p. 280 ; 260,212 (J. P. Bemberg Akt.-Ges.), relating to production of basic copper sulphate, see Vol. XV, p. 621.

International Specifications not yet Accepted

261,769 and 261,770. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. (Assignees of Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. International Convention date, November 19, 1925.

261,769. This is an addition to 243,758. (See THE CHEMICAL AGE, Vol. XIV, p. 137.) A diazo component and a coupling component are coupled, at least one of the components containing one or more carboxylic ester groups. Examples are given in which (1) *o*-amino-benzoic ethyl ester is diazotised and coupled with H-salt ; (2) diazotised *m*-aminobenzoic ethyl ester is coupled with 1 : 8 : 4-aminonaphthol-sulphonic acid ; (3) diazotised *o*-aminobenzoic methyl ester is coupled with 2 : 8- or 1 : 4-naphthol sulphonic acid ; (4) *m*-sulpho-benzene diazonium chloride is coupled with 2 : 3-oxynaphthoic ethyl ester ; (5) diazotised 4-nitro-2-aminobenzoic-methyl-ester is coupled with sodium diphenylamine-*p*-sulphonate ; (6) diazotised *o*-aminobenzoic-methyl-ester is coupled with 2-oxy-3-naphthoic-5-chlor-2-toluidide ; (7) diazotised 4-amino-3-nitrotoluene is coupled with 1-phenyl-5-pyrazolone-3-carboxylic methyl ester.

261,770. Azo dyes are obtained by coupling a diazo compound with a 1-(4^1-chlor-5^1-methyl-2^1-sulpho-)-phenyl-5-pyrazolone in which the 3-position is substituted by a methyl, carboxylic, or carboxylic ester group. In an example, the sodium salt of the ethyl ester is coupled with *o*-aniline-sulphonic acid, the product dyeing wool yellowish-green shades. To obtain the pyrazolones, the corresponding hydrazine is condensed with an ester of acetoacetic or oxaloacetic acid.

261,764. CYCLOHEXYLAMINES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. (Assignees of Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany.) International Convention date, November 19, 1925.

Primary or secondary amines are treated with halogen cyclohexanes in the presence of a catalyst or acid-binding agent to obtain cyclohexylamines. Thus, chlorocyclohexane or bromocyclohexane and aniline are boiled with copper, cooled, and acidified with hydrochloric acid to obtain the hydrochloride of monocyclohexylaniline. Toluidine, naphthylamine, chloraniline, monomethylaniline, diphenylamine, and carbazole can be similarly used. A number of examples are given.

262,075. METAL ACETATES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. (Assignees of Chemische Fabrik Griesheim-Elektron, 31, Gutleutstrasse, Frankfort-on-Main, Germany.) International Convention date, November 27, 1925.

Cobaltic oxyhydrate is treated with acetic acid and a reducing agent such as metallic cobalt powder, by heating above boiling point in a closed vessel. Cobaltous acetate is obtained.

262,086. DEHYDROGENATION OF ALCOHOLS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 27, 1925.

Higher aliphatic alcohols are dehydrogenated, *e.g.*, by passing over heated zinc oxide, and the bulk of the resulting

aldehydes or ketones are condensed by cooling. The residue is separated from the hydrogen by washing in a column with a counterflow of the alcohol to be treated.

262,090. AMMONIA AND ACETYLENE. Omnium des Industries Chimiques Procédés Tocco et Landi, 366, Rue St. Honoré, Paris. (Assignees of L. Tocco and M. Landi, 132, Rue Lafayette, Paris.) International Convention date, November 27, 1925.

Barium carbide is treated with nitrogen to obtain a cyanide, and this is treated with hydrogen to obtain ammonia and regenerate the carbide. If barium oxide or carbonate is employed, acetylene and ammonia are obtained.

262,097. NITRO COMPOUNDS. M. Battegay, 9, Rue de Tivoli, Mulhouse, France. (Assignee of A. Rasouméeff, Mulhouse, France.) International Convention date, November 24, 1925.

A mixture of benzene and sulphuric acid is treated with gaseous or liquid nitrogen peroxide at a low temperature to obtain nitrobenzene. Nitrotoluene and nitro-chlorbenzene can be obtained in a similar manner.

262,099. HYDROGENATING COAL. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 26, 1925.

Moist solid fuels mixed with their liquid hydrogenation products are pressed or centrifuged to remove water. Thus, lignite is mixed with 25 per cent. of the liquid hydrogenation product and pressed at 300 atmospheres, and is then hydrogenated at 400° C. and 300 atmospheres.

262,101. ORGANIC ACIDS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 27, 1925.

Monocarboxylic acids are obtained by passing the vapours of dicarboxylic acids, with or without water vapour, over metals, oxides, hydroxides, silicates, or carbonates, *e.g.*, sodium or calcium carbonate, oxide of zinc, cadmium, lead, bismuth, silicon, aluminium, titanium, iron, or nickel, or granulated aluminium and bauxite. The temperature should be 300°—450° C. The dicarboxylic acids or anhydrides may be obtained by the catalytic oxidation of hydrocarbon vapours, and need not be isolated. Examples are given of the production of benzoic acid, acrylic acid, propionic acid, etc.

LATEST NOTIFICATIONS.

264,791. Manufacture of acetals. Consortium für Electro-Chemische Industrie Ges. January 25, 1926.

264,797. Improved process for the preparation of a concentrated and stable solution of 3-acetylamino-4-oxyphenylarsinic acid by the aid of its ammoniacal salt. Etablissements Poulenc Frères. January 19, 1926.

264,799. Processes for re-activating exhausted pulverulent decolorising charcoal. Verein für Chemische und Metallurgische Produktion. January 22, 1926.

264,800. Improved manufacture of glycerin containing diglycerin and poor in poly-glycerins. Henkel and Cie Ges. January 25, 1926.

264,803. Process for the production of valuable fibre half-stuff. I. G. Farbenindustrie Akt.-Ges. January 25, 1926.

264,804. Process for the manufacture of ureides of dialkyl- or arylalkyl-acetic acids. Hoffmann-La Roche and Co. Akt.-Ges., F. January 20, 1926.

264,823. Production of sodium aluminate. Aluminum Co. of America. January 21, 1926.

264,827. Manufacture and production of unsaturated hydrocarbons I. G. Farbenindustrie Akt.-Ges. January 19, 1926.

264,830. Manufacture of keto-alcohols. I. G. Farbenindustrie Akt.-Ges. January 19, 1926.

264,840. Manufacture of sulphuric acid. Montecatini Soc. Generale Per L'Industria Mineraria Ed Agricola, and Klien, R. January 19, 1926.

264,845. Conversion of saturated hydrocarbons, in gas or vapour form, especially methane, into valuable compounds. I. G. Farbenindustrie Akt.-Ges. January 20, 1926.

264,859. Refrigeration apparatus. Silica Gel Corporation. October 28, 1925.

264,860. Process for converting insoluble substances into a state of aqueous solution or suspension. I. G. Farbenindustrie Akt.-Ges. January 20, 1926.

264,865. Apparatus for electrolysing solutions of alkali chlorides. Krebs, E. January 23, 1926.

264,867. Method of treating phosphates or phosphate-containing substances decomposed by sulphuric acid, and fertilising products obtained thereby. Stockholms Superfosfat Fabriks Aktiebolag. January 23, 1926.

264,879. Manufacture of monodiazo compounds of 1 : 4-diamino anthraquinone-mono- or di-sulphonic acids. I. G. Farbenindustrie Akt.-Ges. January 25, 1926.

Specifications Accepted with Date of Application

253,128. Simultaneous dehydration and purifying of alcohol. Process and apparatus for. Distilleries des Deux-Sevres. June 4, 1925.

254,288. Purifying gases from sulphur, Process for. F. Fischer and H. Tropsch. June 29, 1925.

256,634. Tin-containing ores and metallurgical products, Processes of treating. F. Krupp Grusonwerk Akt.-Ges. August 7, 1925.

263,738. Deodorising fats and oils. Apparatus for. H. Bollmann. December 29, 1925. Addition to 231,701.

264,223. Lithopone, Manufacture of. W. Carpmael. (*Farbenfabriken vorm. F. Bayer and Co.*) October 13, 1925.

264,237. Chemical analysis of liquids, Means for effecting. H. S. Hatfield. October 14, 1925.

264,238. Fluxes used in the welding of aluminium and its alloys, magnesium and its alloys, and other metals and alloys. J. R. Booer, W. R. J. Britten, and District Chemical Co., Ltd. October 15, 1925.

264,261. Carbohydrate compounds, Production of. W. Harrison. October 24, 1925.

264,414. Alloys. T. D. Kelly. September 4, 1926.

264,411. Pyrites and other furnaces. E. Bracq. April 7, 1926.

Applications for Patents

Bishop, W. Varnishes. 2,498. January 28.

British Alizarine Co., Ltd., Goodall, J. R. S., and Nichol, T. C. Dyeing wool, etc. 1,997. January 24.

British Dyestuffs Corporation, Ltd., Chorley, P., Hollins, C., and Lapworth, M. Production of stable diazo compounds. 2,556. January 28.

Carpmael, W. and I. G. Farbenindustrie Akt.-Ges. Activation of carbon, etc. 2,103. January 24.

Carpmael, W. Manufacture of lacquers, etc. 2,315. January 26.

Dreaper, W. P. Manufacture of viscose solutions. 2,004. January 24.

Drescher, H. A. E., Scottish Dyes, Ltd., and Thomas, J. Production of dyestuff intermediates. 2,565. January 28.

Espes, E. Apparatus for detecting carbon monoxide. 2,312. January 26. (France, January 26, 1926.)

Gaertner, A. Process of converting coal into hydrocarbons. 2,425. January 27. (Germany, February 18, 1926.)

Garland, C. S. Edge filtration. 2,548. January 28.

Geigy Akt.-Ges., J. R. Dyestuffs. 2,299. January 26. (Germany, January 28, 1926.)

Hempel, H., and Mürnseer, E. Fire and acid proof pigment. 2,028. January 24.

Hooley, L. J., Scottish Dyes, Ltd., and Thomas, J. Production of dyestuffs, etc. 2,661. January 29.

I. G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Treatment of hydrocarbons with electric arcs. 2,055. January 24.

I. G. Farbenindustrie Akt.-Ges., and Thiemann, W. H. A. Production of phosphorus. 2,044. January 24.

I. G. Farbenindustrie Akt.-Ges. Manufacture of lacquers, etc. 2,315. January 26.

I. G. Farbenindustrie Akt.-Ges. Manufacture of monodiazo-compounds of 1 : 4-diamino-anthraquinone-mono- or disulphonic acids. 2,047. January 24. (Germany, January 25, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of phthaloyl 1-2 : 3-thionaphthene, etc. 2,186. January 25. (Germany, January 29, 1926.)

I. G. Farbenindustrie Akt.-Ges. Extracting vegetable oils. 2,429. January 27. (Germany, January 27, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of isatins, etc. 2,553. January 28. (Germany, January 28, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of dyestuffs. 2,667. January 29. (Germany, January 29, 1926.)

Kunstharzfabrik Dr. F. Pollak Ges. Working up powder into artificial compositions. 2,594. January 28. (Austria, May 15, 1926.)

Marks, E. C. R., and Rohm and Haas Co. Organic compounds. 2,089. January 24.

Ramsay, D. M. Distillation of carbonaceous material. 2,622. January 29.

Rhenania-Kunheim Verein Chemischer Fabriken Akt.-Ges. Chemical manures. 2,218. January 25. (Germany, February 1, 1926.)

Rütgerswerke-Akt.-Ges. Process for working up fluorides containing silicic acid. 2,202. January 25. (Germany, May 31, 1926.)

Schmidt, K. Production of aniline black, etc. 2,081. January 24.

Soc. Française de Catalyse Généralisée. Catalytic production of methyl alcohol. 2,400. January 27. (France, February 9, 1926.)

Wildermann, M. Filter presses. 2,026. January 24.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, 1s. 8½d. to 1s. 9½d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 4d. per gall. Steady. 97/99.—2s. to 2s. 1d. per gall. Pale, 95%, 1s. 10d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d. per gall.

ANTHRACENE.—A quality, 2½d. to 3d. per unit. 40%, 3d. per unit.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.; both according to gravity.

BENZOLE.—Crude 65's, 1s. 3d. to 1s. 4d. per gall., ex works in tank wagons. Standard Motor, 1s. 11d. to 2s. 4d. per gall., ex works in tank wagons. Pure, 2s. 2d. to 2s. 5d. per gall., ex works in tank wagons.

TOLUOLE.—90%, 1s. 11½d. to 2s. 4d. per gall. Firm. Pure, 2s. 2½d. to 2s. 6d. per gall.

XYLOL.—2s. 3d. to 2s. 7d. per gall. Pure, 4s. per gall.

CREOSOTE.—Cresylic, 20/24%, 10½d. per gall. Standard specification, 6¾d. to 9d.; middle oil, 7½d. to 8d. per gall. Heavy, 8½d. to 9d. per gall.

NAPHTHA.—Crude, 9½d. to 1s. 0½d. per gall. according to quality. Solvent 90/160, 2s. to 2s. 1d. per gall. Solvent 95/160, 1s. 11d. to 2s. per gall. Solvent 90/190, 1s. 3½d. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £8 per ton. Whizzed or hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £11 10s. to £12 10s. per ton. Quiet. Flaked, £12 10s. per ton, according to districts.

PITCH.—Medium soft, 110s. to 120s. per ton, according to district. Prices nominal.

PYRIDINE.—90/140, 9s. 6d. to 17s. per gall. Nominal. 90/180, 7s. 6d. per gall. Heavy, 7s. to 10s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—8s. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—9½d. per lb. naked at works.

ANILINE SALTS.—9½d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—4d. to 4½d. per lb.

m-CRESOL 98/100%.—2s. 8¾d. per lb.

p-CRESOL 32/34° C.—2s. 8¾d. per lb.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—2s. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—11d. to 1s. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.

B-NAPHTHYLAMINE.—3s. per lb. d/d.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 9d. per lb. d/d.

NITROBENZENE.—7d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb. d/d.

R. SALT.—2s. 4d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—9d. per lb. naked at works.

p-TOLUIDINE.—2s. 2d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 per ton. Scarce. Grey, £17 5s. per ton. Liquor, 9d. per gall. 32° Tw.

CHARCOAL.—£8 5s. to £10 per ton and upwards, according to grade and locality. Very scarce and in fair demand.

IRON LIQUOR.—1s. 6d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.

RED LIQUOR.—10d. to 11d. per gall. 16° Tw.

WOOD CREOSOTE.—2s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 10d. to 4s. per gall., 60% O.P. Solvent, 4s. per gall., 40% O.P.

WOOD TAR.—£4 to £5 per ton and upwards, according to grade.

BROWN SUGAR OF LEAD.—£41 to £42 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5½d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—2s. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£46 to £55 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—5s. 3d. per lb.

ZINC SULPHIDE.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, Pure, 80%.—£39 per ton ex wharf London in glass containers.

Acid, Acetyl Salicylic.—2s. 5d. per lb.

Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. per oz.; 500 oz. lots, 1s. per oz.

Acid, Boric B.P.—Crystal, £41 per ton; powder, £45 per ton. Carriage paid any station in Great Britain, in ton lots.

Acid, Camphoric.—19s. to 21s. per lb.

Acid, Citric.—1s. 3¼d. per lb., less 5%.

Acid, Gallic.—2s. 8d. per lb. for pure crystal, in cwt. lots.

Acid, Pyrogallic, Crystals.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.

Acid, Salicylic, B.P.—1s. 5d. per lb. Technical.—11½d. to 1s. per lb.

Acid, Tannic B.P.—2s. 9d. to 2s. 11d. per lb.

Acid, Tartaric.—1s. 0½d. per lb., less 5%.

Amidol.—9s. 6d. per lb., d/d.

Acetanilide.—1s. 7d. to 1s. 8d. per lb. for quantities.

Amidopyrin.—11s. 6d. per lb.

Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.

Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: lump, 1s. per lb.; powder, 1s. 3d. per lb.

Aspirin.—2s. 4d. per lb. Good demand.

Atropine Sulphate.—11s. per oz. for English make.

Barbitone.—8s. 9d. per lb.

Benzonaphthol.—3s. 3d. per lb. spot.

Bismuth Carbonate.—12s. 3d. to 14s. 3d. per lb.

Bismuth Citrate.—9s. 3d. to 11s. 3d. per lb.

Bismuth Salicylate.—10s. to 12s. per lb.

Bismuth Subnitrate.—10s. 6d. to 12s. 6d. per lb., all above bismuth salts, according to quantity.

Bismuth Nitrate.—6s. 9d. per lb.

Bismuth Oxide.—13s. 9d. per lb.

Bismuth Subchloride.—11s. 9d. per lb.

Bismuth Subgallate.—9s. 9d. per lb.

Borax B.P.—Crystal, £24 per ton; powder, £25 per ton. Carriage paid any station in Great Britain, in ton lots.

Bromides.—Potassium, 2s. 1d. per lb.; sodium, 2s. 4d. per lb.; ammonium, 2s. 6d. per lb., all spot. Market firmer.

Calcium Lactate.—1s. 5d. to 1s. 6d.

Chloral Hydrate.—3s. 3d. to 3s. 6d. per lb., duty paid.

Chloroform.—2s. 3d. to 2s. 7½d. per lb., according to quantity.

Creosote Carbonate.—6s. per lb.

Ether Meth.—1s. 1d. to 1s. 11½d. per lb., according to sp. gr. and quantity. Ether purif. (Aether B.P., 1914), 2s. 3d. to 2s. 4d., according to quantity.

Formaldehyde.—£39 per ton, in barrels ex wharf.

Guaiacol Carbonate.—6s. 6d. to 7s. per lb.

Hexamine.—2s. 4d. to 2s. 6d. per lb.

Homatropine Hydrobromide.—30s. per oz.

Hydrastine Hydrochloride.—English make offered at 120s. per oz.

Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.

Hydroquinone.—4s. per lb., in cwt. lots.

Hypophosphites.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.

Iron Ammonium Citrate B.P.—2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.

Iron Perchloride.—22s. per cwt., 112 lb. lots.

Magnesium Carbonate.—Light Commercial, £33 per ton net.

Magnesium Oxide.—Light Commercial, £67 10s. per ton, less 2½%; Heavy Commercial, £22 per ton, less 2½%; Heavy Pure, 2s. per lb., in 1 cwt. lots.

Menthol.—A.B.R. recrystallised B.P., 18s. 9d. per lb. net; Synthetic, 12s. to 14s. per lb., according to quantity; 10s. 6d. for 1 cwt. lots and upwards; Liquid (95%), 12s. per lb.; Detached Cryst., 15s. per lb.

Mercurials.—Red Oxide, 6s. 5d. to 6s. 7d. per lb., levig., 6s. to 6s. 1d. per lb.; Corrosive Sublimate, Lump, 4s. 3d. per lb., Powder, 4s. 2d. to 4s. 3d. per lb.; White Precipitate, 5s. 1d. per lb., Powder, 4s. 11d. to 5s. 1d. per lb., Extra Fine, 5s. 1d. to 5s. 2d. per lb.; Calomel, 5s. 3d. to 5s. 5d. per lb.; Yellow Oxide, 5s. 10d. to 5s. 11d. per lb.; Persulph., B.P.C., 5s. 1d. to 5s. 2d. per lb.; Sulph. nig., 4s. 10d. to 4s. 11d. per lb.

Methyl Salicylate.—1s. 9d. per lb.

Methyl Sulphonal.—15s. 6d. per lb.

Metol.—11s. per lb. British make.

Paraformaldehyde.—1s. 9d. per lb. for 100% powder.

Paraldehyde.—1s. 4d. per lb.

Phenacetin.—3s. 9d. to 4s. per lb.

Phenazone.—5s. 9d. to 6s. per lb.

Phenolphthalein.—6s. to 6s. 3d. per lb.

Potassium Bitartrate 99/100% (Cream of Tartar).—85s. per cwt., less 2½% for ton lots. Dearer.

Potassium Citrate.—1s. 11d. to 2s. 2d. per lb.

Potassium Ferricyanide.—1s. 9d. per lb., in cwt. lots.

Potassium Iodide.—16s. 8d. per lb. for 1 cwt. lots.

Potassium Metabisulphite.—6d. per lb., 1-cwt. kegs included, f.o.r. London.

Potassium Permanganate.—B.P. crystals, 6½d. per lb., spot.

Quinine Sulphate.—2s. per oz., 1s. 8d. per oz. for 1000 oz. lots in 100 oz. tins.

Resorcin.—4s. to 4s. 3d. per lb., spot.

Saccharin.—55s. per lb.

Salol.—3s. to 3s. 3d. per lb.

Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.

Sodium Citrate, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb. B.P.C., 1923—2s. per lb. for 1 cwt. lots. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.

Sodium Ferrocyanide.—4d. per lb. carriage paid.

Sodium Hyposulphite, Photographic.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.

Sodium Nitroprusside.—16s. per lb.

Sodium Potassium Tartrate (Rochelle Salt).—80s. to 85s. per cwt., according to quantity.

Sodium Salicylate.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.

Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.

Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.

Sulphonal.—10s. 6d. per lb.

Tartar Emetic, B.P.—Crystal or powder, 2s. to 2s. 2d. per lb.

Thymol.—Puriss., 11s. 9d. to 13s. 9d. per lb., according to quantity. Firmer. Natural, 14s. 9d. per lb. Cheaper.

Perfumery Chemicals

Acetophenone.—7s. 3d. per lb.

Aubepine (ex Anethol).—10s. 6d. per lb.

Amyl Acetate.—2s. per lb.

Amyl Butyrate.—5s. 6d. per lb.

Amyl Salicylate.—3s. per lb.

Anethol (M.P. 21/22° C.).—5s. 6d. per lb.

Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. per lb.

Benzyl Alcohol free from Chlorine.—2s. per lb.

Benzaldehyde free from Chlorine.—2s. 6d. per lb.

Benzyl Benzoate.—2s. 3d. per lb.

Cinnamic Aldehyde Natural.—18s. per lb.

Coumarin.—11s. per lb.

Citronellol.—15s. per lb.

Citral.—9s. 6d. per lb.

Ethyl Cinnamate.—10s. per lb.

Ethyl Phthalate.—3s. per lb.

Eugenol.—9s. 6d. per lb.

Geraniol (Palmarosa).—19s. per lb.

Geraniol.—6s. 6d. to 10s. 6d. per lb.

Heliotropine.—4s. 10d. per lb.

Iso Eugenol.—13s. 6d. per lb.

Linalol.—Ex Shui Oil, 12s. per lb. Ex Bois de Rose, 16s. per lb.

Linalyl Acetate.—Ex Shui Oil, 14s. 6d. per lb. Ex Bois de Rose, 18s. per lb.

Methyl Anthranilate.—9s. per lb.

Methyl Benzoate.—4s. 6d. per lb.

Musk Ketone.—36s. per lb.

Musk Xylol.—8s. 6d. per lb.

Nerolin.—3s. 9d. per lb.

Phenyl Ethyl Acetate.—12s. per lb.

Phenyl Ethyl Alcohol.—11s. per lb.

Rhodinol.—28s. 6d. per lb.

Safrol.—1s. 6d. per lb.

Terpineol.—1s. 6d. per lb.

Vanillin.—19s. per lb.

Essential Oils

Almond Oil.—11s. 6d. per lb.

Anise Oil.—3s. 3d. per lb.

Bergamot Oil.—29s. per lb.

Bourbon Geranium Oil.—11s. 3d. per lb.

Camphor Oil.—63s. 6d. per cwt.

Cananga Oil, Java.—20s. per lb.

Cinnamon Oil, Leaf.—6d. per oz.

Cassia Oil, 80/85%.—8s. 9d. per lb.

Citronella Oil.—Java, 85/90%, 2s. 3d. per lb. Ceylon, pure, 1s. 10d. per lb.

Clove Oil.—6s. per lb.

Eucalyptus Oil, 70/75%.—2s. per lb.

Lavender Oil.—Mont Blanc 38/40%, Esters, 19s. per lb.

Lemon Oil.—9s. per lb.

Lemongrass Oil.—4s. 6d. per lb.

Orange Oil, Sweet.—9s. 9d. per lb.

Otto of Rose Oil.—Bulgarian, 70s. per oz. Anatolian, 30s. per oz.

Palma Rosa Oil.—9s. 6d. per lb.

Peppermint Oil.—Wayne County, 23s. 6d. per lb. Japanese, 9s. per lb.

Petitgrain Oil.—8s. 3d. per lb.

Sandalwood Oil.—Mysore, 26s. per lb. Australian, 17s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, February 3, 1927.

ON the whole markets continue quiet and without special feature, the business passing being mainly for prompt delivery. Prices, however, are very firm with upward tendency. There is considerable export inquiry, but overseas limits are still too low.

General Chemicals

ACETONE.—The market remains at a low level, prices being £57 10s. to £58 10s. per ton.

ACID ACETIC.—Price unchanged and demand fairly good.

ACID CITRIC is very quiet indeed, price being nominally about 1s. 2d. per lb.

ACID FORMIC remains firm, although the demand is rather slow.

ACID LACTIC is quietly steady at £43 per ton, for 50% weight.

ACID TARTARIC.—Makers have advanced their price, but the market at the moment is monopolised by secondhands, the quotation being 11⅜d. to 11½d. per lb.

ALUMINA SULPHATE.—Unchanged at £6 7s. 6d. per ton, for 17-18%.

AMMONIUM CHLORIDE is quiet at £19 per ton.

BARIUM CHLORIDE is only in fair demand, price £9 10s. to £10 per ton.

COPPER SULPHATE.—Unchanged at £24 10s. per ton.

CREAM OF TARTAR is very firm, spot supplies commanding £83 to £84 per ton.

EPSOM SALTS.—The market is firm, the current quotation being £5 10s. per ton.

FORMALDEHYDE.—The demand is for hand to mouth supplies. Price is firm at £42 per ton.

LEAD ACETATE is a firm market at £45 10s. per ton for white and £43 10s. per ton for brown.

METHYL ACETONE is firm at £60 to £61 per ton, American grades being even higher.

METHYL ALCOHOL is quiet and unchanged at £46 per ton.

POTASH CHLORATE.—Unchanged at 3½d. to 3¾d. per lb.

POTASH PERMANGANATE.—High grade quality is quoted 7½d. per lb., demand moderate.

POTASH PRUSSIATE seems inclined to advance in price, the current quotation being 7½d. per lb.

SODA ACETATE has been in better inquiry and important business has been done for export, price £19 10s. to £20 per ton.

SODA BICHROMATE is in good demand, makers' price unchanged.

SODA HYPOSULPHITE.—Unchanged.

SODA NITRITE is a little easier at £19 10s. to £19 15s. per ton.

SODA PRUSSIATE is very firm and higher prices are expected. Current quotation 4¾d. to 4½d. per lb.

SODA SULPHIDE.—Makers are very well sold and market position is healthy for some time.

ZINC SULPHATE.—Unchanged.

Coal Tar Products

The market in coal tar products is fairly quiet, and prices in some directions are somewhat easier.

90's BENZOL is quoted at 1s. 9½d. per gallon, on rails, while the motor quality is quoted at about 1s. 8¾d. per gallon.

PURE BENZOL is worth from 2s. 9d. to 3s. per gallon.

CREOSOTE OIL is quoted at from 7¼d. to 7½d. per gallon, on rails in the country, while the price in London is about 8¼d. to 8¾d. per gallon.

CRESYLIC ACID is steady at 2s. per gallon, on rails, for the pale quality 97/99%, while the dark quality 95/97% is worth about 1s. 11d. per gallon.

SOLVENT NAPHTHA is easier in price, and is quoted at about 1s. 5d. per gallon, on rails.

HEAVY NAPHTHA is quoted at 1s. 2d. to 1s. 3d. per gallon, on rails.

NAPHTHALENES are somewhat easier, the 76/78 quality being worth about £8 5s. to £8 15s. per ton, while the 74/76 quality is worth about £7 15s. to £8 per ton.

PITCH.—Supplies are not yet abundant and the tone of the market is rather firm. To-day's value is 120s. to 130s. per ton, f.o.b. U.K. port.

Latest Oil Prices

LONDON.—LINSEED OIL firm and 5s. higher for near. Spot, £33, ex mill; February, £31 15s.; February-April, £31 12s. 6d.; May-August, £31 10s.; September-December, £32. RAPE OIL steady. Crude, extracted, £45 10s., ex wharf; technical, refined, £47 10s., naked. COTTON OIL firm. Refined common edible, £40; Egyptian crude, £34; deodorised, £42. TURPENTINE firm, unchanged to 9d. per cwt. higher. American, spot, 52s. 6d.; March-April, 53s. 9d.; May-June, 54s. 9d.; and July-December, 53s. 9d.

HULL.—February 2.—LINSEED OIL.—Naked, spot to May-August, £32; September-December, £32 10s. COTTON OIL.—Naked Bombay crude, £33 and Egyptian crude, £34 10s.; edible refined, £38; technical, £37; deodorised, £40. PALM KERNEL OIL.—Crushed, naked, 5½%, £39 10s. GROUNDNUT OIL.—Crushed-extracted, £42; deodorised, £46. SOYA OIL.—Extracted and crushed, £34; deodorised, £37 10s. RAPE OIL.—Crude-extracted, £44 10s.; refined, £46 10s. per ton, net, cash terms, ex mills. CASTOR OIL and COD OIL unaltered.

Calcium Cyanamide

THE advance of 2s. per ton for February, bringing the price to £9 14s. per ton delivered in four-ton lots, carriage paid to any railway station in Great Britain, has not caused any check to business, which continues to be active both for prompt and forward delivery.

DR. D. A. MACINNES, of the physico-chemical research laboratory of the Massachusetts Institute of Technology, has joined the staff of Rockefeller Institute for Medical Research, New York.

THE UNIVERSITY OF CHICAGO has received from Mr. G. H. Jones, director of the Inland Steel Co., a gift of 415,000 dollars, which will be used for the establishment of a chemical research laboratory.

TWO AUSTRALIAN RESEARCH STUDENTS, nominees of the Commonwealth Research Council, are to work for two years at the British Fuel Research Station on Professor Bergius's method of extracting oil from coal.

THE OPIUM COMMISSION of the League of Nations has adopted the proposal of Sir Malcolm Delevingue calling for an investigation by the Governments of all countries where narcotics are manufactured in order to determine the sources from which drugs used illegally are obtained. Penalties are to be imposed on manufacturers, traders, and others found guilty of supplying narcotics for other than scientific or remedial purposes.

Nitrogen Products

Export.—During the last week or two the sulphate of ammonia position has remained unchanged and the prices remain steady at about £11 2s. 6d. per ton, f.o.b. U.K. port, in single bags. The stocks of sulphate of ammonia in several countries seem to be considerable, and nobody is yet in a position to judge whether they will be absorbed by heavy early spring demand.

Home.—The home position in the United Kingdom continues to be satisfactory; sales up to the end of January being well above those of last year. The prices for February delivery are £12 3s. per ton for neutral quality, 20·6 per cent. nitrogen guaranteed, delivered in bags to consumer's nearest station. There is every indication of an unusually heavy home demand, although this forecast may be upset if February is a wet month.

Nitrate of Soda.—The nitrate of soda position continues quiet, with heavy stocks in Chile as well as consuming centres. Considerable sales are now being made at scale prices; nevertheless it is anticipated that large stocks will be carried over to the new season.

Benn Brothers' Other Journals

THE CABINET MAKER.—Second Exhibition Number; Completed Review of Exhibitors at the Wholesale Furniture Exhibition at Olympia; Notes from the Home Journals; New Books; Forthcoming Lectures at the Geffrye Museum.

THE ELECTRICIAN.—The Re-Lighting of the Alhambra; Hydro-Electric Development in New Zealand; The K.L. 1 Valve; Progress with the Wiring the Homes of Britain Campaign.

THE FRUIT GROWER.—"Modern Methods of Marketing Fruit," by H. V. Taylor; "New Type of Movable Glasshouse," by H. Goude; A Season's Tomato and Cucumber Results.

GARDENING ILLUSTRATED.—Does Fruit Growing Pay? Opinions of Growers in many parts of the country; The Regal Lilies, beautifully illustrated by the Editor; Early Snowdrops, Hellebores, and Snowflakes; "Winter Beauty in the Garden," by E. H. Wilson; Seed Potatoes.

THE GAS WORLD.—Cartoon by Wallace Coop; Monthly By-Product Coking Section; Coke Oven Gas for Town's Supply.

THE HARDWARE TRADE JOURNAL.—Education in the Ironmongery Trade; The Student and Builders' Hardware; Novelties at the British Industries Fair; Motor Transport; Hardware at the Furniture Exhibition; Methods and Enterprise of Retailers; Business Opportunities.

THE TIMBER TRADES JOURNAL.—Some Difficulties in the Merchanting of Timber; Oaks: Their Distinguishing Features; Modern Driving Schemes in Woodworking Factories.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, Feburary 2, 1927.

BUSINESS in the heavy chemical market still remains fairly bright and there is an appreciable amount of business in relation to offers made. Prices remain fairly steady, one exception being an advance of 10s. per ton, in the price of liquid caustic potash; solid quality remains unchanged.

Industrial Chemicals

ACID ACETIC, 98/100%.—£55 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 to £38 per ton; 80% technical, £37 to £38 per ton, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flakes, £34 per ton; powder, £36 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC ICE CRYSTALS.—Still in rather poor demand. Now quoted 6¼d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC B.P. CRYSTALS.—Now quoted 1s. 2¾d. per lb., less 5% ex store. Offered for early delivery from the Continent at 1s. 2½d. per lb., less 5% ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC, 80°.—Quoted £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—In good demand and spot material now quoted up to 4d. per lb., ex store. On offer from the Continent at 3¾d. per lb., ex wharf.

ACID SULPHURIC, 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—In rather better demand at 11½d. per lb., less 5% now asked for spot material ex store. Offered for prompt shipment from the Continent at 11¼d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot material on offer at about £6 per ton, ex store. Quoted £5 8s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent.

ALUM, POTASH.—Lump quality quoted at about £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal powder 5s. per ton less. Spot price £9 2s. 6d. and £8 10s. per ton, ex store respectively.

AMMONIA, ANHYDROUS.—Now quoted 10d. per lb., ex store, containers extra and returnable.

AMMONIA, CARBONATE.—Lump, £37 per ton; powder, £39 per ton, packed in 5-cwt. casks delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £23 to £24 per ton, ex station. Continental material on offer at about £20 15s. per ton, c.i.f. U.K. ports. Fine white crystals of Continental manufacture quoted £18 15s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—In moderate demand and supply for early delivery still limited. Quoted £19 15s. per ton, ex wharf. Spot material on offer at £20 5s. per ton, ex store.

BARIUM CARBONATE, 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £8 per ton, c.i.f. U.K. ports, packed in bags. Casks 7s. 6d. per ton extra. Offered on spot at about £9 12s. 6d. per ton, ex store.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers £8 per ton, ex station, minimum 4 ton lots. Spot material 10s. per ton extra. Continental now quoted £7 10s. per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental on offer at £3 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or at £4 12s. 6d. per ton, f.o.b. U.K. ports for export.

COPPER SULPHATE.—English material quoted £23 per ton, f.o.b. U.K. ports. Continental on offer at £21 10s. per ton, c.i.f. U.K. ports.

FORMALDEHYDE, 40%.—Quoted £38 10s. per ton, c.i.f. U.K. ports. Spot material available at about £40 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental now quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material quoted £35 per ton, ex store.

LEAD, WHITE.—Quoted £36 per ton, ex store.

LEAD ACETATE.—White crystals quoted £43 per ton, c.i.f. U.K. ports; brown about £40 10s. per ton, c.i.f. U.K. ports; white crystals offered on spot at about £44 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

POTASH, CAUSTIC, 77/92%.—Solid quality unchanged at £27 5s. per ton, c.i.f. U.K. ports, minimum 15 ton lots. Smaller quantities 15s. per ton extra. Liquid quality, 50° Be, advanced by 10s. per ton to £14 10s. per ton, c.i.f. U.K. ports, minimum 15 ton lots.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE.—96/98% quoted £25 5s. per ton, ex wharf, early delivery. Spot material on offer at £26 10s. per ton, ex store. 90/94% quality quoted £22 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 98/100%.—Quoted £24 10s. per ton, c.i.f. U.K. ports; powdered quality crystals £2 per ton extra.

POTASSIUM NITRATE (SALTPETRE.)—On offer for prompt shipment from the Continent at £21 5s. per ton, c.i.f. U.K. ports, spot material available at £23 5s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 6¾d. per lb., ex store, spot delivery. On offer for early shipment at 6½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Still in good demand. Spot material now quoted 7½d. per lb., ex store. Offered for forward delivery at 7⅜d. per lb.

SODA CAUSTIC.—Powder, 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton; 70/72%, £14 10s. per ton, carriage paid station, minimum four-ton lots, on contract. Spot material, 10s. per ton extra.

SODIUM ACETATE.—English material quoted £22 10s. per ton, ex store. Continental on offer at about £19 per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¼d. per lb., delivered buyers' works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powder or pea quality, £1 7s. 6d. per ton more; alkali, 59%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Continental quality offered at £8 per ton, ex wharf, prompt shipment packed in bags. Casks, 10s. per ton extra. Pea crystals, photographic quality, of British manufacture, quoted £14 10s. per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 per ton, ex store. Refined quality, 5s. per ton extra.

SODIUM NITRITE, 100%.—On offer at £21 per ton, ex store, spot delivery.

SODIUM PRUSSIATE (YELLOW).—Now quoted, 4⅜d. per lb., ex store, spot delivery. Offered for prompt shipment at 4¼d. per lb., ex wharf.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 7s. 6d. per ton; ex works.

SODIUM SULPHIDE.—60/65%, solid, £12 10s. per ton; broken, £13 10s. per ton; flake, £14 10s. per ton; crystals, 31/34%, £8 10s. per ton, and £9 per ton, according to quality, delivered buyers' works, minimum four-ton lots on contract. Price for spot 5s. per ton, extra for solid, 2s. 6d. per ton, extra for crystals; 60/62% solid quality offered from the Continent at about £9 7s. 6d. per ton, c.i.f. U.K. ports; broken, 15s. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £11 10s. per ton; rock, £11 10s. per ton; floristella, £11 per ton; ground American, £9 15s. per ton, ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered, 20s. per ton extra.

ZINC SULPHATE.—Continental material on offer at about £10 10s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

I.C.I. Directors on Cement Co. Board

THE Oxford and Shipton Cement Co., with an authorised capital of £500,000, divided into 500,000 ordinary shares of £1 each, has been formed to acquire the Oxford Portland Cement Co., as a going concern, and to carry on the business of cement manufacturers. A first mortgage debenture of £100,000 is being guaranteed under the Trades Facilities Acts. An issue will be made during the week-end of 400,000 ordinary shares of £1 each, at par. The board includes Sir John Brunner, Bart., and Henry Ludwig Mond—who are both directors of Imperial Chemical Industries and the Mond Nickel Co., etc.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, February 3, 1927.

Although the aggregate volume of business being put through on the Manchester chemical market is much below normal, there is certainly rather more activity to be reported on home consumption account, with users still displaying rather more interest in forward positions. For export, inquiry is only of moderate extent, with most of the business that is passing for shipment to the colonies and the East. Taking the market as a whole, in spite of odd cases where values are falling a little, the tone remains steady.

Heavy Chemicals

Chlorate of soda meets with a quiet demand and if anything prices are a shade stronger at 3d. to 3¼d. per lb. Hyposulphite of soda continues to move off in relatively small lots although there has been little alteration in the level of quotations, commercial material offering at £10 per ton and photographic at about £15 5s. For phosphate of soda prices range from £12 10s. to £12 15s. per ton and a moderate business is being done. Caustic soda continues to sell in fairly satisfactory quantities at steady prices, ranging from £14 10s. per ton for 60 per cent. strength to £16 10s. for 76 per cent. Alkali also is in fair demand at £6 15s. per ton. There is little stirring in the case of sulphide of sodium, but prices keep steady at £8 5s. per ton for commercial quality and £11 to £11 5s. for 60-65 per cent. concentrated solid. Glauber salts are quiet and somewhat easy at round £3 10s. per ton, with saltcake in moderate demand at about the same figure. Inquiry for bichromate of soda is on a fair scale and quotations are maintained at 3⅜d. to 3½d. per lb. Bicarbonate of soda is also steady and in quiet request at £10 10s. per ton. Prussiate of soda continues rather scarce and in steady inquiry and values keep firm at 4½d. per lb. A slow business is being done in nitrite of soda at round £19 5s. per ton. Bleaching powder is unchanged and in fair demand at £8 per ton.

The potash products have kept remarkably steady during the past week. Inquiry for caustic potash and carbonate of potash is maintained at its recent level and values are fully held at £29 and £26 5s. per ton respectively. Permanganate continues to move off slowly, but there has been little alteration in prices, B.P. quality hovering round 6d. per lb., and commercial at 4¾d. Yellow prussiate of potash is firm and in fair demand at 7¼d. per lb. Chlorate of potash meets with slightly more inquiry, with current values between 3¼d. and 3½d. per lb. For bichromate of potash the demand is on a quietly steady scale and quotations are firm at 4¼d. per lb.

Arsenic is not particularly active, but with offers on the short side values maintain their strength at about £17 5s. per ton at the mines for white powdered, Cornish makes. Acetate of lime is somewhat easier at £16 5s. per ton for grey quality and £9 for brown, with demand quiet. White acetate of lead is in moderate request at £44 to £44 10s. per ton and brown at £41. Nitrate of lead is slow but about unchanged at £40 per ton. Sulphate of copper meets with a certain amount of inquiry at £24 to £24 5s. per ton, f.o.b.

Acids and Tar Products

Spot supplies of oxalic acid are rather scarce and prices are firm in consequence at 3¾d. to 4d. per lb., with demand fairly good. Citric acid is still a dull section and values are easy at 1s. 2⅜d. per lb. Tartaric acid, however, keeps fairly steady at 11¼d. per lb., although there is not much business passing at the moment. Acetic acid is in moderate request with prices well held at £37 per ton for 80 per cent. commercial and £66 to £67 for glacial.

There is a quiet demand for carbolic acid crystals with values little changed on the week at round 6¾d. per lb. Current prices for pitch are in the neighbourhood of £5 15s. per ton, f.o.b., but export business is on a modest scale, with supplies still on the short side. Creosote oil is quiet at 7¼d. per gallon. Solvent naphtha is attracting little attention at 1s. 8d. to 1s. 8¼d. per gallon.

The French War Ministry have decided that each French infantry battalion will be equipped with liquid flame-throwing apparatus. The use of liquid flame warfare is forbidden by the international treaty, to which France is a signatory, but it is stated officially that instruction in the use of the flame-throwers is purely for defensive purposes in case any future enemy resorts to flames.

Fixation of Atmospheric Nitrogen

On Saturday evening, January 29, Mr. A. J. Dale, B.Sc., A.I.C., delivered a lecture before the Stoke-on-Trent Association of Engineers, on "Atmospheric Nitrogen." The chair was occupied by the president, Mr. A. T. Green, A.Inst.P. Mr. Dale said that at first thought the subject of atmospheric nitrogen would appear to be a purely chemical proposition, with little or no connection with engineering. However, with scientific progress proceeding at such a startling rate within the last half century, it became more difficult to mention any industrial process that could be defined in terms of any one of the apparently distinct branches of science, such as physics, chemistry, engineering, or even geology. Practically every one of the applied sciences involved a knowledge at least of three or more of the purer sciences. The lecturer proceeded to discuss the fixation of atmospheric nitrogen, mentioning the history of the subject and the various processes worked out by Schonherr, Birkeland and Eyde, and Haber. The importance of the products obtained was pointed out. In conclusion, Mr. Dale stressed the importance of fundamental research, for most of the vital discoveries made in the laboratory, when applied to industrial and national problems by the chemist or engineer, had brought about far-reaching progress.

Chemist's Charter

The Scottish section of the British Association of Chemists held a social evening in the Trades House Restaurant, Glasgow, on Friday, January 28. The principal guests were Professor Thomas Gray, of Glasgow Royal Technical College, and Major James Johnson. Dr. Wharton, the chairman, emphasised the need for registration, and while disagreeing with the attitude adopted by the Institute of Chemistry in its recent report on this question, said he was not unduly pessimistic. He felt that close co-operation would ultimately exist between the Institute and the B.A.C. The Association from its inception had consistently advocated the need for registration, and would carry on in spite of all discouragements. Registration was necessary. It was the chemists' charter. The recognition and establishment of the chemists' status could only be of the greatest benefit to the nation.

Large Railway Orders for British Firm

The Great Southern Railway of Ireland, the principal railway company in the Free State, have decided to equip their main line depots at Inchicore, Ballybrophy, Limerick, and Cork with water softening installations of the most modern and scientific type, and have placed the entire order for this work with a British firm, United Water Softeners, Ltd., of London. The provision of softened and purified water for the locomotives throughout the system will effect substantial economies in respect of fuel consumption and repair bills, and render possible a great increase in engine mileage between cleanings. The Sudan Government Railways and the Great Indian Peninsular Railway have also placed orders for softening installations with United Water Softeners, Ltd., the water softener adopted in all three cases being the well-known Lassen-Hjort lime-soda system, already used on British railways.

Women Chemical Workers

Dr. E. P. Cathcart, Gardiner Professor of Chemical Physiology, Glasgow University, who had been requested by the Medical Research Council to undertake an inquiry into the physical condition of women workers, read a paper before the members of the Royal Institution on Tuesday. The heaviest work that he had noted was that carried out in the chemical works of Glasgow and the brickworks in the Midlands. In the chemical works the girls employed were remarkable for their physique and the grace of their carriage. The astonishing thing was that the majority of these young women—no girl was employed under the age of 16—were born and bred in one of the worst districts in Glasgow, and the mothers and grandmothers of many of the women employed had done the same work before them. As evidence of what these workers could do, he had seen one woman who shovelled 20 to 25 tons of raw material a day.

Company News

W. J. Bush and Co.—An interim dividend of 3 per cent. on the ordinary shares was paid on January 12.

Mond Nickel Co.—The directors have declared an interim dividend of 5 per cent. on the ordinary shares in respect of the financial year ending April 30, 1927, payable on March 1.

Anton Jurgens United Margarine Works.—The final dividends on the three classes of preference capital for the year to December 31 were payable at 3 per cent. actual on Tuesday, February 2.

Jurgens, Ltd.—It is announced that a dividend for the half-year ended December 31 on the (guaranteed) 7 per cent. cumulative participating preference shares at the rate of 7 per cent. per annum were payable on February 1.

Anglo-American Oil Co.—It is reported that the Anglo-American Oil Co. is to absorb the Glico Petroleum Co., and that an offer is to be made to shareholders in the latter of one Anglo-American share for every two Glico, the deal being dependent upon 75 per cent. of the shareholders in the Glico agreeing to the scheme.

English Velvet and Cord Dyers' Association.—The profits of the year ended December 31 last, including interest, dividends and transfer fees, and after making provision for income tax, amount to £9,094, against £62,316 for the previous year. After deducting depreciation, £19,273, and debenture interest £8,379, there is a loss of £18,558. Profit on investments realised was £6,279, and the net balance brought forward was £25,087. There has been transferred from reserve £30,000, so that there is available £42,808. After allowing for the preference dividend, the directors recommend a final dividend on the ordinary of 4 per cent. per annum, making 4 per cent. for the year, carrying forward £14,809.

British Photographic Industries, Ltd.—The directors have submitted a scheme for the reorganisation of capital. The proposals entail the writing down of the issued capital by £216,560, of which £110,596 is in respect of goodwill, premium on shares, etc., £21,000 is in respect of stamp duty, etc., and £84,974 will be applied to writing down other assets of the subsidiaries and eliminating debit balances of those companies. To provide the £216,560 it is proposed to write down the ordinary shares from £1 to 6s. 8d. The £375,800 preference share capital will remain unaltered, but holders of the preference shares are asked to cancel all arrears of dividends up to December 31 last—when the arrears totalled £124,014—in consideration for which they are to receive an allotment of two ordinary shares for every five preference shares now held.

Tariff Changes

Australia.—A Customs Proclamation (No. 134) revokes the Proclamation dated September 7, 1914, and provides for the control of the importation of injurious drugs by prohibiting absolutely the importation into the Commonwealth of raw and prepared opium, and providing that medicinal opium and other similar drugs such as morphine, diacetylmorphine, crude cocaine, cocaine, ecgonine and salts, etc., may only be imported under licence, renewable annually, exclusively for medical or scientific purposes, in accordance with conditions prescribed in the Proclamation. Customs Proclamation No. 135 revokes the Proclamation of April 18, 1924, and prohibits the exportation of opium and similar drugs as mentioned in Proclamation (No. 134) except with the written consent of the Minister of State for Trade and Customs.

Peru.—H.M. Representative at Lima has forwarded translation of Law No. 5,556, which increases by 5 per cent. the Peruvian Monopoly Taxes on spirits and alcoholic beverages.

Poland.—The Commercial Secretary to H.M. Legation at Warsaw reports that the Order of March 4, 1926, as amended by subsequent Orders, under which a reduction of 80 per cent. of the Customs duty is accorded to machinery and apparatus of kinds not manufactured in Poland, when imported into Poland for purposes laid down in these Orders, have been continued in force until June 30 next, by a further Order effective as from January 1.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to March 2, 1927.

"Spangles."

475,671. Class 1. Chemical substances used in manufactures, photography or philosophical research and anti-corrosives. Borax Consolidated, Ltd., 16, Eastcheap, London, E.C.3; merchants. December 8, 1926. (To be Associated. Sect. 24.)

"Ramasit."

476,159. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Class 1. I. G. Farbenindustrie Aktiengesellschaft (a Joint Stock Company organised under the laws of Germany), Mainzer Landstrasse 28, Frankfort-on-Main, Germany; manufacturers. December 23, 1926.

"Ephetetonin."

476,189. Class 3. A chemical preparation for use in medicine and pharmacy. The firm trading as E. Merck, Frankfurterstrasse 250, Darmstadt, Germany; manufacturers. December 24, 1926.

"Extrol."

462,563. Liquid vegetable extracts for use in the manufacture of perfumes. Class 4. Schimmel and Co., Miltitzstrasse 1, Miltitz, near Leipzig, Germany; manufacturers. August 26, 1926.

"Berkelac."

474,539. Raw or partly prepared vegetable, animal and mineral substances used in manufactures. Class 4. F. W. Berk and Co., Ltd., 106, Fenchurch Street, London, E.C.3; chemical manufacturers and merchants. November 4, 1926. (To be Associated. Sec. 24.)

"Silcanite."

476,143. A powdered mineral used in manufactures. Class 4. Colin Stewart, Ltd., Wharton Lodge Works, Winsford, Cheshire; manufacturers of components for the paint trade. December 23, 1926.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Gas-operated Refrigerators.—A Winnipeg company is desirous of obtaining, at the earliest possible moment, particulars and prices from British manufacturers of gas-operated refrigerators large enough to produce one hundred pounds of ice per day. (Reference A.X. 4163.)

Raw Materials and Machinery for the Drug and Perfumery Trades, etc.—A firm in Vienna desires to secure the representation, on a commission basis, of British manufacturers and suppliers of raw materials and machinery for the manufacture of chocolates, sweets, prepared foods, pharmaceutical chemicals, cosmetics and soaps. (Reference No. 107.)

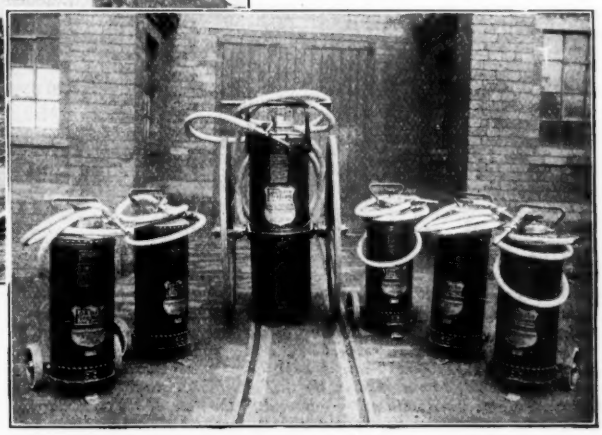
Road-making Bituminous Materials.—An old-established firm in Berlin-Steglitz is desirous of securing the representation of British manufacturers. Correspondence may be conducted in English. (Reference No. 115.)

Photographic Goods and Pharmaceutical Products.—A firm of wholesale and retail merchants in Salonica desires to obtain the agency of British firms. (Reference No. 116.)

Synthetic Fertilisers and Goitre

References were recently made in the Prussian Landtag to the increase of the incidence of goitre, and it was suggested that this may be referred to the poverty of foods in iodine. This may arise from the ever-increasing use of synthetic nitrogenous fertilisers, Chili nitrate usually containing some iodine. The Prussian Government has opened discussions with the Leuna works of the I.G., with a view to the addition of iodine to synthetic fertilisers.

A general view of Sneyd Colliery and a part of the special fire equipment—a 34-gallon and five 10-gallon Foamite Engines—installed to ensure that uncontrolled fire should not be a menace



Safeguard production against the fire menace

DIMINISHED production as the outcome of a fire invariably means heavy loss. *This menace can only be guarded against by installing appliances adapted to the risk involved.*

Backed by a Company manufacturing every type of first-aid appliance, Foamite Fire Protection Engineers are able to prescribe *the right protection in the right place.*

LIQUID—or GAS—or FOAM

For ordinary fires, the "Firespray," which ejects mainly water, may be adequate. It is *not* recommended for extra hazardous risks where inflammable liquids are used or stored.

For some purposes a heavy gas, as produced by Carbon Tetrachloride machines like the "Fire-Gun," is a suitable extinguishing medium. How often though are such devices used upon fires which are outside their scope!

The only sure way to put out blazing petrol, paint, varnish, etc., is by the application of Firefoam, which is produced by Foamite appliances. By blanketing the surface of the liquid with a layer of tough, heat-resisting foam, the air is excluded and combustion ceases. Firefoam kills all ordinary fires. It is also used at numerous electrical power stations.

Foamite representatives are always ready to demonstrate upon request the form of protection best suited to your particular risk.

Send for a free copy of the booklet entitled *Extinguishing Oil and Other Fires.*

FOAMITE FIREFOAM, LTD.

24/26 MADDOX STREET, LONDON, W.1

Representatives in all leading towns

Foamite Fire Protection

A Complete Engineering Service

Against Fire

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

ECCLES, John, Randal Street, Blackburn, chemical manufacturer. (C.C., 5/2/27.) £18 16s. December 31.

MORRISONS (DYERS AND CLEANERS) LTD., Hampton Hill. (C.C., 5/2/27.) £10 7s. December 31.

NON-AS-ESI, LTD., Bridgeway House, Bridge Road, Hammersmith, polish manufacturers. (C.C., 5/2/27.) £12 0s. 6d. December 30.

TAYLOR, J. AND J., AND CO., 3/7, Seddon Street, Liverpool, paint manufacturers. (C.C., 5/2/27.) £11 3s. 10d. December 31.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an*—followed by the date of the Summary, but such total may have been reduced.*]

BROTHERS CHEMICAL CO. (1922), LTD., Manchester. (M., 5/2/27.) Registered January 19, mortgage to Bank; charged on property in Mosley Road, Trafford Park. *Nil. April 9, 1926.

PARKIN NESS AND CO., LTD., Darlington, chemical manufacturers. (M., 5/2/27.) Registered January 24, £2,100 (not ex.) mortgage, to Bank, charged on Parkgate Chemical Works, Parkgate, Darlington, with machinery, etc.

PHILLI-MIBANO (1926), LTD., London, S.W., manufacturing chemists. (M., 5/2/27.) Registered January 19, £3,000 debentures (filed under section 93 (3) of the Companies (Consolidation Act, 1908), present issue £2,000; general charge.

SANKEY (JOHN) AND SON, LTD., Manchester, soap manufacturers. (M., 5/2/27.) Registered January 19, £2,000 (not ex.) charge, to Bank; charged on property in Moston Lane, Blackley. *Nil. December 27, 1926.

SHUTTLEWOOD AND FANSHAWE, LTD., Leicester, dyers and finishers. (M., 5/2/27.) Registered January 21, £60,000 debenture and charge to Assurance Co.; charged on properties at Leicester, also general charge.

London Gazette, &c.

Order Made on Application for Discharge

CHAMBERS, Joseph Faraday, trading as J. F. CHAMBERS AND CO., The Laboratory, Arnold, Nottinghamshire, manufacturing chemist. (O.M.A.D., 5/2/27.) Discharge suspended for twelve months until October 21, 1927.

Company Winding Up Voluntarily

BREWERS SUGAR CO., LTD. (C.W.U.V., 5/2/27.) By special resolution, passed January 12, confirmed January 28. John Low, secretary of the company, appointed liquidator. Meeting of creditors at the office of the liquidator, Berry Yards Refinery, Lynedoch Street, Greenock, on Monday, February 14, at 12 noon. (The creditors of the company will be paid in full.)

Receivership

DAVIES SONS AND CO. (DERBY), LTD. (R., 5/2/27.) A. G. Mellors, of 1, King John's Chambers, Bridlesmith Gate, Nottingham, C.A., was appointed Receiver on January 14, 1927, under powers contained in first mortgage debentures dated September 14, 1918.

New Companies Registered

THE AUSTRALIAN COMMONWEALTH CARBIDE CO., LTD., 51, St. Mary Axe, London, E.C.3. Registered as a public company on February 1. Nom. capital, £300,000 in 180,000 8 per cent. participating preferred ordinary shares of £1 each and 400,000 deferred shares of 1s. each. To adopt an agreement between H. W. Hensman, barrister, and L. N. Coombe, C.A. (for the company), for the acquisition of the benefit of an agreement for the purchase from the Tasmanian Government of the business of manufacturing carbide and carbide by-products, carried on by them at Electrona, Tasmania, together with certain lands, buildings, and other property belonging thereto, or used in connection therewith, and to carry on the business of manufacturers of and dealers in carbides, cyanamide, nitrogen, nitric acid, sulphuric acid, ammonia, sulphate of ammonia, nitrate of ammonia, cyanides, nitroline (calcium cyanamide), sulphur, synthetic rubber and chemicals of all kinds, etc. Directors: Major-General Sir Frederick Hugh Sykes, Sir Francis Watson, F. W. J. Moore. Qualification: 250 preferred ordinary shares. Remuneration: (except managing director), free of income tax, £300 per annum each (chairman £400).

BRITISH SAFETY FILMS, LTD.—Registered as a "public" company on January 26. Nom. capital, £150,000 in £1 shares (25,000 7 per cent. cumulative preference and 125,000 ordinary). To carry on the business of cinematographers, cinematograph, colour and photographic printers, manufacturers of photographic materials of all kinds, photographers, producers of, dealers in and agents for fixtures, films, lanterns, etc. Subscribers:—G. E. Garrett, The Cottage, Betchworth, H. T. Page. Solicitors: Kenneth Brown, Baker, Baker, Lennox House, Norfolk Street, Strand, London, W.C.2.

CHROMIUM PLATING AND DEVELOPMENT CO., LTD.—Registered January 28. Nom. capital, £15,000 in £1 shares. To acquire from E. V. Hayes-Gratze, M. Fink, and A. Hurter the benefit of certain existing inventions of processes relating to the electro deposition of chromium, and to carry on the business of chromium miners, refiners and platers, metallurgists, etc. Directors: E. V. Hayes-Gratze, 1, Gledhow Gardens, South Kensington, S.W.5, A. Hurter, and S. D. Kittel.

SEALCOTE MANUFACTURING CO., LTD.—Registered January 28. Nom. capital, £1,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in chemicals and chemical products and mixtures of all kinds, etc. Solicitors:—H. S. Holt, 6, Gray's Inn Square, W.C.1.

THE NON-INFLAMMABLE FILM CO., LTD.—Registered on January 26 as a "public" company. Nom. capital, £550,000 in 500,000 ordinary shares of £1 and 1,000,000 deferred shares of 1s. To carry on the business of manufacturers of all substances, whether non-inflammable or inflammable, for cinematograph films and pictures, and of dry plates, films, cameras or photographic and cinematographic apparatus, accessories and chemicals, photographers, printers, lithographers and publishers, etc. Directors:—Sir Herbert E. Blain, St. Ermins, Westminster, London (chairman); Dr. H. Levinstein (deputy chairman), Sir John W. Courtis, D. MacCallum, E. W. Mann, Sir John de F. Pennefather, T. S. Stewart-Smith. Qualification: £1,000. Remuneration: £300 each per annum (chairman £750, deputy-chairman £500).

Butter-fat Percentages

MR. J. F. TOCHER, in the latest *Journal of the Scottish Board of Agriculture*, definitely declares that the average percentage of butter-fat varies widely among different breeds of cattle without respect to age. Average percentages, taken from large numbers of each breed, he quotes as follows: Jersey 5·43, Guernsey 5·16, Kerry 4·67, Welsh 4·40, Ayrshire 4·09, Shorthorn 3·91, Friesian 3·63. He enumerates various factors upon which the percentage of butter-fat in milk depends: (1) Breed of cow; (2) her age; (3) number of weeks in milk; (4) percentage of solids, not fat; (5) percentage of lactose; (6) yield per milking; (7) hereditary qualities; (8) number of cows in the herd; (9) incomplete mixing of sample when drawn for analysis; (10) unequal intervals between two milkings; (11) variable weather; (12) pathological factors; and (13) partial milking.